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PETROLEUM INVESTIGATION

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Pt. 3-5

HEARING

BEFORE A

SUBCOMMITTEE OF THE COMMITTEE ON INTERSTATE AND FOREIGN COMMERCE HOUSE OF REPRESENTATIVES

SEVENTY-SIXTH CONGRESS

THIRD SESSION

ON

H. Res. 290 and H. R. 7372

TO PROMOTE THE CONSERVATION OF PETROLEUM; TO PROVIDE FOR COOPERATION WITH THE STATES IN PREVENTING THE WASTE OF PETROLEUM; TO CREATE AN OFFICE OF PETROLEUM CONSERVATION; TO AMEND THE ACT OF FEBRUARY 22, 1935, AS AMENDED, AND FOR OTHER PURPOSES

FEBRUARY 6, 7, 8, AND 9, 1940, AT WASHINGTON, D. C.

PART 3

(Note: Part 1—not so indicated—contains the November hearings at Washington, D. C.)
(Index appears at end of hearing)

Printed for the use of the Committee
on Interstate and Foreign Commerce

9471

UNITED STATES
GOVERNMENT PRINTING OFFICE
WASHINGTON : 1940

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PETROLEUM INVESTIGATION

TUESDAY, FEBRUARY 6, 1940

House of Representatives,
Subcommittee of the Committee on
Interstate and Foreign Commerce,
Washington, D. C.

The subcommittee met, pursuant to call, in the committee room, New House Office Building, at 10 a. m., Hon. William P. Cole, Jr., presiding.

Mr. Cole. The committee will please come to order.

I want to announce for the record that Mr. Wolverton, a member of the subcommittee has been detained at home.

We are glad to have Chairman Lea of the committee present this morning, as well as Mr. Crosser, Mr. Patrick, Mr. Bulwinkle, Mr. Boren, members of the main committee, also quite a number of other Members of the House who are not members of the committee. The committee is honored in having a very distinguished group of Governors of many of our oil-producing States. The committee appreciates this manifestation of interest and assures each Governor that every consideration will be given the valuable and helpful contribution which will be made by him to these important hearings.

Governor Ratner, we will be very pleased to hear you at this time.

STATEMENT OF HON. PAYNE RATNER, GOVERNOR OF THE STATE OF KANSAS

Governor Ratner. Mr. Chairman and members of the committee; there are nine Governors here present who will be glad to have the privilege of being heard by your committee briefly and then there are personal representatives of some other Governors present.

I appreciate greatly this opportunity to appear before you in behalf of the State of Kansas. I am not an expert and do not pretend to know all the technical answers. However, only a few become sufficiently steeped in technical lore to qualify as specialists. I am one of those who must fight for what he believes is right and oppose that which he knows is wrong, using the most reliable information available.

To me, it is self-evident that certain fundamental principles must guide the policies of any people if they are to enjoy the benefits of sound government. These principles are firmly embedded in our system of constitutional government. We recognize that changed conditions may justify new policies but we must also recognize that innovations are not just justified merely because they are new, and

Federal control is neither necessary nor desirable simply because conservation can be used as a legitimate objective. This committee is to decide whether it is necessary for the Federal Government to regulate a great industry to prevent waste and whether such a policy would endanger or destroy those things which have been developed under State control and regulation. I appear before you today to urge that neither this type of legislation nor any form of Federal control is necessary.

Crude oil has been produced in the State of Kansas for more than 50 years. We now have nearly 20,000 oil wells, located in some 600 pools, which, if allowed to produce their full potential, would place Kansas in third position in relation to the output of crude petroleum. At the present time, approximately 15,000,000 acres of land in the State are either productive of oil or gas or leased for future development. Kansas has produced over a billion barrels of crude oil and ranks fourth among the oil-producing States with respect to ultimate production. The value of the crude oil produced in Kansas during 1937 was in excess of $88,000,000.

Before proration was introduced in Kansas, wasteful practices prevailed in the production of oil. The legislature and the Governor of the State recognized the necessity of conserving our crude petroleum and natural gas resources, and on March 15, 1931, there was enacted the first conservation law prohibiting the production of crude oil in such manner as to constitute waste was enacted. The power and authority of administering that act was delegated to a bipartisan commission, and that body was directed to make such rules, regulations, and orders as were necessary to prevent waste. The public interest was thereby promoted.

Progressive amendments to this statute have given the commission of my State every power reasonably necessary to enable it to prevent waste in any of its forms. We realize that administration of the statute has not been perfect, but, on the other hand, the effectiveness of our regulations to prevent waste has progressively increased until conservation is an accomplished fact in Kansas. There may be instances which require additional regulation, but the State law, the commission which administers it and I, as Governor of the State, stand ready, willing, and able to search out and prevent waste, if any exists within the State of Kansas.

The accumulated experience of 10 years of waste prevention has resulted in the establishment of a State agency fully prepared to cope with any of the numerous problems arising out of conservation. These years of experience have shown the wisdom of conservation. If some States, lacking experience as major oil-producing States, have not enacted adequate conservation laws, the States which have should not be penalized by unnecessary Federal regulation.

We have found it advantageous to cooperate with the oil industry. Since conservation is mutually beneficial to the oil States and to the industry as well as the Nation, cooperation effectively aids in the prevention of waste. We have endeavored to utilize the knowledge and experience of the industry, and at the same time to give its representatives an opportunity to know our administrative problems. This has been accomplished in my State by the creation of an oil advisory committee composed of a representative cross section of the producers. Furthermore, cooperation among the several oil-producing States has been accomplished by means of the Interstate Oil Compact in which member States have representation. Permanent and material benefits have flowed from this relationship. Waste has been more effectively prevented, and the parties involved have been able to understand and appreciate the problems and difficulties of those who regulate and those who are regulated.

Mutual understanding and respect between the oil-producing States and between the State regulatory bodies and the industry is a gradual development. It must be based upon confidence which comes from experience. The practical results in less than 10 years show remarkable progress. The program, I believe, should be encouraged and perfected, not destroyed or badly crippled.

Proration involves a dual program—curtainment of excessive production and the allocation of allowed quotas. This has been handled under the policy power of the several States which have surplus potential production, primarily from the standpoint of preventing physical waste, but in Kansas, at least, also to bring about and maintain stability in this important basic industry, with its vital influence upon our State and National economy.

Conservation laws prohibiting waste have existed upon the statute books of most oil- and gas-producing States for several years. With the growth of engineering knowledge, especially with increased factual data obtained under the new technique of operating wells materially below their maximum output, statutes in most States have been amended, improved, and strengthened.

In the early twenties, the oil industry was hard pressed to meet an enormously accelerating demand which was created by the rapidly expanding automobile industry. New discoveries were exploited as promptly as possible, frequently under conditions involving grievous waste. There were alternate periods of overproduction followed by shortage, which caused the industry to operate under a "feast or famine" economy which was harmful to the public as well as to the industry.

Formerly our crude-oil supply consisted principally of settled production, wholly inadequate to supply the rising rate of demand. To this was added the new flush production whenever it happened to be developed. Now we still have a backlog of settled production, and instead of haphazard flush production from erratic discoveries, we have a steady, flowing output restrained to levels which, in many cases, can be maintained at the same rate for from 5 to 10 years, and in some cases much longer. Under these circumstances, the oil industry, in 1940, finds itself able to serve the public better with crude-oil storage less than half that of 1930, although the current rate of consumption is almost 50 percent greater than in 1930. These conditions are almost wholly the result of proration and conservation programs now enforced by practically all of the major oil States.

Where are the facts that demonstrate that the Nation should fear a shortage of oil or gas in any emergency, and where do they demonstrate that the States have failed to assure an adequate supply?

We agree that it is necessary and desirable to restrict the production of individual wells to prevent waste of gas, loss of pressure, and undue encroachment of water, but such restraints as are imposed upon an individual well must take into consideration the rights and equities of its owner and also the owners of other wells.

It is significant that the Cole bill does not recognize that any rights or equities are involved, for it does not contain a single provision which mentions proration or correlative rights.

In addition to this primary basis of waste prevention, there is a secondary basis of control by pools. Such steps, however, are still insufficient to prevent physical and economic waste and maintain a prosperous industry unless the over-all production is brought into balance with total consumptive requirements, usually referred to as market demand.

With adequate proven reserves and large surplus potential production immediately available from wells already drilled, the necessity of controlling this surplus went hand in hand with the ability to produce efficiently. This required that wells be spaced properly, operated at efficient rates, and that gas wastage be avoided. The benefits gained by regulating the rate of production of individual wells and by controlling the output of pools would be lost if the over-all production was allowed to exceed materially the current rate of consumption. Surplus production cannot force itself into increased consumption, but it has to be put into storage This results in avoidable waste.

Price levels over the past 20 years effectually refute any charge that proration, as enforced by the States, is merely a price-fixing scheme. It is true that proration has smoothed the curve of price fluctuations. It has eliminated those anomalies of the complete economic cycle annually, but such price gyrations were harmful both to the oil industry and to the consuming public. To seize upon the price levels during the past 6 years, which represent adjustments from the extreme low world-wide depression, to prove an allegation that curtailment of production to bring supply into balance with demand was the cause of the price advance above the crisis levels is unrealistic. The highest prices of the last 20 years were witnessed before State proration statutes were generally adopted. It is the rise from the bankrupt levels to stability at a fair price, to which opponents of orderly withdrawals points as evidence that proration has fixed prices. If this were true, we should have seen steadily strengthening crude prices, because proration enforcement has increased in recent years. On the contrary, crude-oil prices have recently tended to weaken under proration. Another complete refutation of those mistaken allegations of price fixing becomes apparent by comparing crude prices with general raw material prices and even with grain prices. Raw material and grain prices have remained substantially above crude-oil prices since conservation has developed, even though the law of the jungle has been abandoned.

The consuming public has fared well with respect to the price of gasoline. The quality of motor fuel has been improved greatly, yet the retail price has declined 60 percent since 1920 and 25 percent since 1930. Thus, the incontrovertible record of the prices during the proration period leaves no ground whatever for the charges sometimes advanced that proration has increased the cost of motor fuel. Actually, proration has decreased the cost of motor fuel to the public. Furthermore, the full benefits from a scientific and orderly production are ahead of us and not behind us.

Under a program of sound and sane balance between supply and demand, there is no occasion for any substantial amount of any commodity such as crude oil to sell for long below its cost of production.

Nor are the best interests of the consuming public well served thereby, because the continuation of such a situation will reduce, if not eliminate, the ever necessary search for additional reserves to supply future demands. The Cole bill does not propose to meet this situation. It does not propose to enable the industry to maintain reserves adequate to assure the national defense. On the other hand, it does propose to permit the industry to produce large quantities of oil daily in excess of economic requirements, if the wells producing the oil can do so without causing physical waste therein and if storage facilities are available, and I submit storage of crude oil above ground is economic waste. I want to repeat that. I submit that storage of crude oil above ground is economic waste.

The prosperity and well-being of the oil industry in Kansas is imperative to the general welfare of the State. Forty thousand persons, or 5 percent of all those gainfully employed in this State, are directly employed by the petroleum industry. Many thousands of other persons, both in related and unrelated pursuits, receive economic benefits therefrom. Approximately 10,000 workers were employed at oil wells during 1938 and received $15,700,000 as compensation for their labor. That compensation is nearly 40 percent of the $40,500,000 received by all workers in all manufacturing industries in the State that year.

The annual royalty payments to farmers and other royalty owners equal $10,000,000, and an additional $10,000,000 is divided in varying amounts to every county in the State as annual rentals on oil and gas leases. Many of our 105 counties are nearly solidly leased for oil and these royalties and lease rentals have been of great aid to the farmers of Kansas during the recent years of drought and low farm income. I stress the importance of the economic benefits of the oil industry to the citizens of Kansas. The annual royalties and delay rentals are sufficient to pay the taxes on all the farm lands and farm improvements in the 61 western counties of the State and leave about 8½ million dollars in addition. The income from oil in these counties would have paid the annual expenditure for relief in the entire State of Kansas, local, county, and State.

If economic needs are to be satisfied by nonwasteful production, or if reserves adequate to the national defense are to be maintained, the industry must be capable of producing more oil than can be consumed. While this capacity must exist, its utilization must be restrained. May I emphasize that point: While the capacity must exist, the use of that capacity must be restrained. By this means the economic welfare of the Nation generally will be served along with the industry. It should be retained in underground storage as has been done by the proration laws, rather than in wasteful aboveground storage.

The National Government has no police power. It cannot pass laws designed to promote the general welfare on that ground alone. On the other hand, the States possess police power and can, as the State of Kansas has, not only provide for the conservation of crude oil and natural gas, but enforce legislation designed to promote the discovery of adequate crude oil reserves by assuring the prosperity of a primary industry and thereby promoting the general welfare of the State. The curtailment or destruction of the oil industry in Kansas would cause serious economic loss to all the people of Kansas.

As developed within the last 10 years, and particularly within the last 5, State conservation presents an example of mutual cooperation within an industry, and with the State and Federal Governments, a control which prevents waste and tends toward a reasonable economy but without rigid regimentation. Competition remains keen and aggressive; the number of individual oil producers shows annual increases; private initiative has not been destroyed. New inventions and technical improvements continue and better products have been constantly supplied to the public at reduced prices.

The enactment of the Cole bill will destroy the inherent rights of the States to exercise their police power to conserve their natural resources. The State and Federal Governments would attempt to supervise the same pools and, although the industry would be thoroughly regulated, the producers themselves would be confronted with serious dilemmas. The States would prescribe certain regulations while the Federal commissioner, due to differences of opinion between experts, might prescribe different rules. The producers would attempt to serve two masters but their task would be an impossible one; the inevitable result would be a conflict between State and Federal authority. Ultimately the matter would be brought to the attention of the courts and the result might be that the States would be compelled to yield to the Federal regulations. I cannot believe that the Congress or this committee will find it either expedient or necessary to require the States to surrender their sovereignty.

Why should penalties of the kind the Cole bill would impose be inflicted upon the States which have enacted and enforced conservation laws? It is stated that the Federal administrator would not interfere or supersede the regulations of the States which were and are conserving their crude-oil reserves, but the bill contains no provisions exempting States from Federal control which have adequate conservation statutes. Whenever the policy of the State differed from that of the Commissioner, we would find that the policy of the Commissioner would be imposed.

The Cole bill vests a Commissioner with extremely great power. He is authorized to exercise the broadest kind of discretion. The delegation is so broad that it contains few, if any, practical limitations. Instead of laying down a legislative policy within which the Commissioner is directed to act, the bill might conceive to be desirable. It is extremely doubtful, to use Justice Cordoza's metaphor, whether the Cole bill creates a canal with sufficient banks to prevent the current from overflowing the entire country.

The production of oil and gas has never been held to constitute interstate commerce. The Supreme Court has said time and again that production was not interstate commerce. We will concede that under recent decisions the courts might hold that such was the case, but there are certainly grave doubts in that regard. I have always understood that it was better to enact legislation based upon established legal precedents than to rely upon concepts which were, at best, a hopeful expectancy. The industry is familiar with State conservation laws. Valuable investments have been made on the basis of the law established by them. When property rights are once fixed they cannot be disturbed without great injustice, and even in this day we believe there is some merit in property rights.

If the production of oil shall constitute interstate commerce, then the Federal Government may, and we must conclude that it likely will, regulate every industry in all of its aspects. There is no basic commodity which does not flow in interstate commerce and if one can be controlled, all can be. Why, then, should we turn our backs upon American principles and cast off on a tangent, the result of which is more than speculative?

I believe that the enactment of legislation by the Federal Government which duplicates State law should be avoided until the matters concerned are beyond the effective control of the States or when public opinion is so crystalized as to justify such national action.

Both of these conditions are lacking in the present case.

In a State that is rapidly developing, frequent legislative adjustments are necessary. By the process of trial and error States have learned how to cope with their new problems. If such legislation was attempted on a national scale it would, in many instances, prove not only inconvenient but disastrous. For example, a law that would prove practical and permit the orderly and efficient development and exploration of crude oil in Kansas might not work to advantage in the States of Texas or Pennsylvania.

The National Government for the first half century of its history concerned itself principally with problems that, by their nature, were national in scope and national in character. The States, on the other hand, were left to deal with local problems, free from Federal interference. During more recent times, there has been a tendency on the part of the Federal Government to greatly enlarge its field of operation. This extension of national authority has been in the most part under the guise of a paramount necessity. Whether such encroachment was necessary in some instances is seriously questioned. It is questioned here.

We in Kansas, an oil-producing State in the midcontinent area, believe the State government is vested with certain rights and authority under the constitution of Kansas and of the United States and State Constitutions. Certain other authority has been delegated to the Federal Government. The foundation of the Republic, the union of the States, was based upon this division of authority. When the Federal Government seizes upon authority formerly vested in the States it is breaking down the foundation. The regulation and authority should be kept as close to the people as possible. That is the aim of representative democracy. Passage of the Cole bill would strike at the very structure of State sovereignty.

Even with their faults, the States have served well as laboratories for new and novel experiments. The people of a State keep in touch with and are interested in its legislative and administrative policies. They subconsciously feel such policies are theirs. If a statute or administrative order is made which adversely affects any one of them, he feels he can immediately make his grievance known to the regulatory body of his State where he may expect and receive a reply and correction within a reasonable time. The average person feels this is his privilege and that he has a right to exercise it. Such a close personal touch is not possible with control at Washington. This direct control is only possible between a State and its own citizens.

In the administration of our conservation law in Kansas, a prompt and final decision can and is made on all questions by a regulatory body that is in close personal touch with the oil industry without the party requesting action becoming involved in a mesh of red tape. This efficiency in service would be impossible under Federal regulation.

In view of the position I have taken, I am not unmindful that the Federal Government has a definite place in the oil picture. Cooperation between the Federal and State Governments is desirable. The Connally Act has been of valuable assistance to the States. The forecasts of the Bureau of Mines of the Department of the Interior have enabled the States to restrict production to the market demand; and the stabilizing effect of the restriction upon unnecessary imports of crude oil has also been beneficial. But we, as citizens of this Nation, believe that all men should have and enjoy an equal opportunity; that the rewards we receive are proportionate to the efforts made. It is our desire to leave all the rights and privileges now available to those in the future who will guide the destinies of this country. To do this, we must be constantly on our guard, as eternal vigilance is the price of liberty.

Gentlemen, in the light of these facts we register our opposition to the Cole bill. We believe its passage would do great damage to a great Kansas industry, thus doing economic injury to the entire State. We fear this bill is a step which would undermine the basic structure of the Republic. We hope the committee will recommend that the Cole bill be not passed.

Thank you very much for your courteous attention.

Mr. COLE. Governor Ratner, are the representatives of the State Corporation Commission of the State of Kansas to appear?

Governor RATNER. They are, sir; but as a convenience to many of the Governors that have to get away, if the committee please, we would appreciate it if the Governors could all be heard first. The regulatory bodies will wait for the committee's convenience, as there are several Governors here who have to get away.

Mr. COLE. Then as to conditions existing in certain fields in the State of Kansas, some other witnesses will appear who can answer questions pertaining to the administration of the law in your State?

Governor RATNER. They are here to answer those questions.

Mr. COLE. You would prefer that the members of the commission answer those questions?

Governor RATNER. Yes, sir; and if you please, they are here for that purpose.

Mr. COLE. I would like to ask you one or two questions if you will permit.

Governor RATNER. All right, sir.

Mr. COLE. The present commission, under your State law is appointed by you?

Governor RATNER. Yes, sir; it is.

Mr. COLE. Is the entire personnel of the commission different than under the administration of Governor Landon?

Governor RATNER. Yes, sir.

Mr. COLE. Was the change of personnel of the commission made because of any difference of attitude with that you have just given us?

Governor RATNER. The previous commission resigned, Mr. Chairman, and I appointed members to fill vacancies created by their resignations, although, to be entirely frank, I probably would have changed them anyway.

Mr. COLE. Where is Mr. Lee, who was associated with the problem at that time? Do you know to whom I refer?

Governor RATNER. I believe I do. I think he is in Kansas.

Mr. COLE. Mr. Marvin Lee.

Governor RATNER. I think he is in Wichita, but I am not sure.

Mr. COLE. He was the technical adviser to the State Corporation Commission of Kansas for a number of years and appeared before the committee in 1934.

In 1934 this committee had before it legislation known as the Thomas-Disney bill. It was, as I think all will agree, a very rigid Federal regulatory measure. The State Corporation Commission of the State of Kansas appearing before the committee conducting the investigation in 1934 stated the following—I quote from the hearings at that time.

> While experiments already made in Federal control of the oil industry has not been perfect, we believe that in the main they have not only been beneficial to the producers, but have been in the general public interest. Great benefits have resulted to labor, to land owners in payment of rentals and royalties, and to countless other industries directly or indirectly.

That is the end of one quotation. I quote again.

"We believe"—still quoting your State commission.

Governor RATNER. Are you quoting from Kansas or Texas? You said Texas.

Mr. COLE. The State of Kansas. I do not want you to be charged with their statements.

Governor RATNER. I was wondering about that.

From whom are you quoting, Mr. Chairman?

Mr. COLE. The State Corporation Commission, the chairman of which was a former member of the House, Hon. Homer Hoch, Hon. J. W. Greenleaf, and Hon. Ernest E. Blincoe, being the other commissioners, at the time, and this is the statement prepared and presented in Mr. Lee's testimony. I quote further:

> We believe that it would be unwise to attempt in one bill to correct all of the ills of the industry. Such a bill would not only prove impractical if enacted, but its proposal would, in all probability, provoke such sharp controversies and lead to such long-drawn-out hearings that it might fail of passage. We believe that within the limits of Federal jurisdiction, Federal control should be made more certain and positive through additional legislation to prevent the wasting of this great natural resource, to promote the orderly development and stabilizing of the industry, to help meet the employment situation in the oil fields and to protect the consumer against exorbitant prices in the future.
>
> We recommend that any Federal control legislation beyond that necessary to prevent discrimination or other unfair practices, should apply only in emergencies and then only as a conservation measure.

Now, I rather interpret from the statement you presented to us today that you are in very bold disagreement with the attitude of your State commission at that time.

Governor RATNER. Yes, sir; and may I make a brief explanation?

Mr. COLE. Yes, sir.

Governor RATNER. Or for that in 1934, Mr. Chairman.

Mr. COLE. 1934.

Governor RATNER. All right, sir. We have had 6 years of experience and improvement in the administering of our proration and conservation law, in practice, in Kansas, since that statement was made and I am quite sure and sincerely believe that any one of those gentlemen would now agree with my position, and I earnestly feel that all of the leaders in Kansas, both of the oil industry and the political leaders in both parties feel as I do about the situation at the present time in the light of the 6 years of experience and success that we have had with our proration law in Kansas.

Mr. Cole. Governor, was the shut-down of August 1939, signed by you or by the Commission?

Governor Ratner. I knew all about it. I do not recall. I think the Commission signed it. I do not think I signed it. Under our law it would be signed by the Commission, but I was fully conversant with the situation.

Mr. Cole. In the passage of that order, the reasons given for the action by your State, with which I assume you were familiar, 5 years after the hearings of 1934, in other words, August 16, 1939, were in part as follows:

> It appearing to the satisfaction of the Commission that great and irrevocable injury is about to be caused by the production of crude oil during the emergency hereinafter declared to exist and that the continued production of crude oil during such period will in all probability cause waste, as defined by the statutes of this State.

And then it goes on, assigning as one of the reasons that the effect of economic waste to develop at the time and injury can be minimized and corrected by the issuance of an order closing in each and all of the oil wells located within this State.

Do you recall that at the time of the passage of the shutdown order of August 1939, the question of waste was involved as the reason for your action?

Governor Ratner. It seems to me, Mr. Chairman, that the shutdown order demonstrates very clearly the efficacy and efficiency of the State's conservation and proration laws and practices wherein we were able to act quickly and effectively to prevent waste.

It is our contention under the conservation statutes of our State we are in a position to and that we do prevent waste and preserve conservation.

It seems to me that action demonstrated beyond all question that we are able to do it, and we do do it.

Mr. Cole. Governor, have you any suggestions to offer to the committee as to what if anything should be done where we have two great States producing in excess of the State of Kansas and doing so without any regulatory legislation whatsoever?

Governor Ratner. These matters, of course, come from experience and take a little time. All of the States did not enter this conservation zone at the same time. There are four more States which we feel reasonably sure will pass proration laws and join the interstate oil compact this year. There may be one or two large producing States which will not join this year and it may take another year or two, but we believe it is better to take a little longer time, in the good old fashioned American way, and preserve the American principles of Government, rather than to be so impatient and so anxious to hurry up, that we abandon the American principles of government in order to get a little quicker action.

Mr. COLE. Then it is your judgment that it would be better for us to just await future developments in the States we both have in mind and that nothing be done until they see fit to act?

Governor RATNER. Not entirely, because we are doing something. We are working steadily and have been for months to try to bring those States to the opinion and belief that they should adopt the same measures some of the other States have adopted. We believe we are making very definite headway, Mr. Chairman, and we think we have a right to hope within a reasonable length of time those States will join with the others in similar conservation laws.

Mr. COLE. I was interested in reading over the week end again the cross-examination of one of the witnesses while our hearings were being held in New Orleans. I believe Colonel Thompson was on the stand at the time. It may have been Mr. Sadler. I am not sure. I was interested in that part in which Mr. Mapes drew the picture as he saw it; drew this conclusion, that his constituents in the State of Michigan—he had fields close by his home and in his district—under very rigid and apparently satisfactory control, would be unwilling to submit not only to such controlled regulation but to have their markets taken from them promiscuously and at will by States like Illinois, for instance, which is producing at will and as Mr. Mapes felt affecting the markets of the State of Michigan.

Now, I understand your position to be that should Illinois proceed to increase its production daily that that State is to be permitted to produce without regulation, and to ship into market enjoyed by the producers of the State of Kansas, without any regulation, unless the legislature sees fit to do something about it in the distant future.

Governor RATNER. I am not sure that I understand your question, Mr. Chairman.

Mr. COLE. Well, the question is somewhat involved. Let me see if I can make it clearer in this way:

Mr. Mapes took the position that it was unfair to the State of Michigan, to the producers of the State of Michigan, under very rigid control, to expect their producers to continue under such regulations and to have their markets affected more and more each day by the increased production of the State of Illinois where there is no control by law.

I am wondering whether the State of Kansas is willing to, and the producers of the State of Kansas are willing to be subjected to the limitation upon production as they are and have their markets affected as they must be ultimately by the State of Illinois, which is without any regulation whatsoever.

Governor RATNER. Well, we believe, as I said a minute ago, that Illinois will come under regulation in the near future; but we also believe, Mr. Chairman—and I think the oil producers of Kansas agree with me—that as between the choice of going along with Illinois unregulated, and the choice of having everything controlled from Washington, and changing the form of the American system of government, that the Illinois situation is the lesser of the two evils.

Mr. COLE. Of course, in 1934 your position was different. You had east Texas to contend with at that time and that, I think, was accountable for the States of Kansas, Oklahoma, and other States desiring some action by the Federal Government. The Connally Act took care of that problem. Am I right in that conclusion?

Governor RATNER. As I said in my statement, we think the Connally Act has been of very valuable assistance. We think it is a very definite field of cooperation between the Federal Government and the States, and we think the way the Connally Act performs and the way the Bureau of Mines cooperates, has been very helpful.

That is a matter of cooperation rather than a matter of the Federal Government taking a great industry in contravention of what we believe are in contradiction of the American principles of government.

Mr. COLE. All right. Are there any questions, gentlemen. Mr. Pearson would like to ask a question.

Mr. PEARSON. Governor, what was the cause of the shutdown in August 1939?

Governor RATNER. To prevent waste.

Mr. PEARSON. Because of accumulated surplus on hand at that time?

Governor RATNER. Here is what happened: The regulatory bodies of the States had been allowing—the various States—to produce more than the Bureau of Mines had estimated. There was one of two things to do: Either cut down over a period of months to a lesser degree, or cut down altogether for a short period of time to sort of catch up with the estimates, let the market demand catch up with production, so that there would not be waste in aboveground storage.

We chose the shorter of the two methods, and the fact that in 1939 the production was within three-tenths of 1 percent of the Bureau of Mines estimates showed that there was pretty good cooperation.

Mr. PEARSON. That order made at that time was not due to any action taken by the interstate compact commission, was it?

Governor RATNER. No, sir: it was not. The order was made, the decision was made in Kansas before the representatives of Kansas attended the interstate oil compact conference. It was made in Texas before that conference was held.

Mr. PEARSON. Did you at that time call a meeting of the Governors of Oklahoma and representatives of the State of Texas and yourself for the purpose of discussing what action the three States should take?

Governor RATNER. Not at that time. We had a conference several months later on another matter relating to this Cole bill. I had some telephone conversations with them. I want to be perfectly frank with you gentlemen. I had some telephone conversations with them and some telegraph communications.

Mr. PEARSON. That is with Colonel Thompson and Governor Philiips?

Governor RATNER. Yes, sir.

Mr. PEARSON. And as I understand it, the action taken following those conferences was taken by each State acting on its own and not through the compact commission. Is that true?

Governor RATNER. Yes; that is true.

Mr. PEARSON. The situation was such in each of the three States that they all felt that some action should be had?

Governor RATNER. We all are in the Mid-Continent field, you know, and conditions are similar throughout the field.

Mr. PEARSON. Yes.

Mr. COLE. Thank you very much, Governor.

Governor RATNER. Thank you very much for your attention.

STATEMENT OF HON. JERRY SADLER, MEMBER, TEXAS RAILROAD COMMISSION, AUSTIN, TEX.

Mr. SADLER. May I make a 30-second statement?

Mr. COLE. The Chair will recognize the gentleman.

Mr. SADLER. We do not have our Governor up here with us, Mr. Chairman. He is busy writing some poetry [laughter] and we do not have him up here, but we will do the very best we can, if the committee desires any further information from Texas, any other than that we put in in New Orleans, we will try to do so, and we will protect the good name of Texas. Thank you.

Mr. COLE. Mr. Sadler, the Chair wishes to state that he has a telegram from Governor O'Daniel, which he will read into the record at the proper time. But I am not going to take the time of the Governors here present to read the telegram now.

We will hear Governor Phillips, or any of the Governors in such order as you gentlemen may desire.

Governor PHILLIPS of Oklahoma. Mr. Chairman, there are nine Governors present and if the committee has any particular desire on how we shall go ahead, of course, we want to do it the way you wish. However, several of them have short statements, and if it is within the realm of your pleasure, they will proceed with those and I will come along toward the last. I will take probably more time than some of the other Governors.

Mr. COLE. We will hear the Governors in any order they desire to appear.

Governor PHILLIPS. Then I suggest that you hear Governor Holt, of West Virginia.

Mr. COLE. We will hear Governor Holt, of West Virginia.

STATEMENT OF HON. HOMER A. HOLT, GOVERNOR OF THE STATE OF WEST VIRGINIA

Governor HOLT. Mr. Chairman and gentlemen of the committee: The petroleum production of West Virginia is not large, when compared with that of many of the other States represented here on this occasion. However, I desire to join the other Governors present, and their representatives from their respective States, in recommending to the committee that this bill be not passed.

As I see it this bill embodies proposals for the extension of Federal authority which is neither necessary nor warranted by the conditions of the industry at this time.

Mr. COLE. Governor, might I ask just for the record, if your natural gas industry in West Virginia is not quite substantial.

Governor HOLT. Quite substantial.

Mr. COLE. Quite substantial?

Governor HOLT. Yes, sir.

Mr. COLE. And that is regulated by the Federal Government?

Governor HOLT. Regulated by the Government?

Mr. COLE. Is it regulated by the Federal Government to any extent under recent legislation?

Governor **Holt**. There is some recent legislation which deals with the transportation of it in interstate commerce.

Mr. **Cole**. In other words, your natural gas industry is subject to a lot more Federal legislation than your petroleum?

Governor **Holt**. I do not think that the regulation of natural gas authorized thus far by the Federal Government has reached any far point. However, I understand that there are some cases pending now which will involve interpretation and application of some recent Federal enactments.

Mr. **Cole**. Thank you, Governor.

Governor **Phillips**. If you will hear Governor Carr, of Colorado, Mr. Chairman.

Mr. **Cole**. Governor Carr, we will be very glad to hear you at this time.

STATEMENT OF HON. RALPH L. CARR, GOVERNOR OF THE STATE OF COLORADO

Governor **Carr**. Mr. Chairman and members of the committee: Colorado at the present time does not occupy a position comparable to the States of Oklahoma, Kansas, and Texas in the production of petroleum, of course, but the geologists tell us, and I think your records bear them out, that sometime in the future Colorado is certain to become a great oil-producing State. It has been estimated that in western Colorado, the petroleum in the oil shale deposits is so great that it exceeds the total production of petroleum in the United States up to the present time, threefold.

Colorado is apprehensive of the provisions of the Cole bill, because of the conditions which may obtain when it starts producing oil on a large scale, and the statement made by Governor Ratner, and the statements to come from Governor Phillips may be received to that extent as a part of the protest of Colorado.

Colorado is particularly apprehensive because of what we consider the encroachment upon States' rights under the provisions of this bill. I wonder if you will permit me to outline to you a condition existing in our State at the present time, at this very moment, which will illustrate why we are afraid if there is further encroachment upon the right of a State to determine for itself how it will control its great industries.

Colorado started as a mining State and became known, of course, throughout the early years of its development, because of its mineral output; but coincidental with the development of the mining industry, Colorado became an agricultural and livestock-raising State. Colorado is what is called the haystack State of the West. All but one of the great rivers in the western country, the Columbia, rise in the mountains of Colorado and the waters from the snows and rain which fall on our high tops are used to irrigate the lands of the farmers of all of the Western States, with one or two exceptions, and of many of the Midwestern States as well.

Irrigation then has come to be our great industry and is our great concern at this time.

Today, at Denver, in the chambers of the State supreme court, there is being conducted a hearing, in an original case before the

United States Supreme Court. This case had its origin between the State of Nebraska as complainant and the State of Wyoming as the defendant, and the State of Colorado was interpleaded as a defendant against its will. This case has to do with the allocation and distribution of the flow of the North Platte River, which rises in Colorado, runs across a corner of Wyoming, and thence through the State of Nebraska.

The Federal Government, by a series of statutes in the early history of the West, said that all persons should acquire their rights to the use of water from the streams of the West under the laws and according to the regulations set up by the several States.

The lower Federal courts and the Supreme Court itself on many, many occasions have recognized the proposition that interstate rivers are the property of and are subject to the control and administration of the States as such. Since the decision in the first great case including the ownership of water as between the States themselves which is the case of *Kansas* v. *Colorado*, the opinion which was written by Mr. Justice Brewer, there was developed the doctrine that each State owns and exercises an equitable sovereignty over a portion of every interstate stream which every other State must recognize and respect.

On that theory and under their own constitutions and statutes, the States have permitted individual landowners and farmers to divert water and apply it to beneficial uses and the ownership of that water and the right to continue to use it, has been based upon the priority of use and such application to beneficial uses. This has been the basis, the very foundation, of the development of the Rocky Mountain west and particularly of Colorado.

On the Colorado River, the Arkansas, the Rio Grande, the Republican, the North Platte, the South Platte, and all of the others, there are millions of acres of land in Colorado under cultivation, which have been irrigated for from 50 to 75 and 80 years with the water from those streams.

Our courts have repeatedly said that a right of this character is a vested right, a freehold right—a right as sacred and as valid as the fee title ownership of land itself.

Land without water on those river bottoms is worth maybe $1.50 or $2 an acre. With a supply of water for irrigation it is worth from $35 to $150 an acre. Water then is the very basis of the ownership of land in an agricultural country in that section.

In spite of these Federal statutes; in the face of these uniform decisions of our Federal courts, the representatives of the Department of Justice last Monday morning, a week ago yesterday, started offering evidence on behalf of the United States as intervenor in the case to support the theory that the United States Government is entitled to and is the owner of all of the unappropriated water of the North Platte River because the Bureau of Reclamation had made certain statements in filings in Nebraska and Wyoming in 1904. The United States now claims the right to control the distribution of the flow and the administration of the North Platte River under that theory and for other reasons, one of which is the contention that the States have fallen down in their administration of the river, and that it is necessary for the National Government to step in.

A second reason assigned is that because certain reclamation projects have been commenced in recent years, and now are being developed, the United States has expended so much money that it has an investment which it must protect at the expense of the rights of the States.

Now, here is the situation: A man acquires a vested property right under State laws in the water of the North Platte River by reason of his diversion of a certain amount and by its application to a beneficial use for irrigation purposes in 1905, we will say. Thirty-five years later the United States starts the construction of a reclamation project. Men who were not even born when that homesteader started taking his water and acquiring his rights, are going to come in now and start farming land under a reclamation project in 1940. It is the intention, so announced by counsel for the Government, to issue deeds of conveyance of the waters of the North Platte which will partake of the nature of patents, if you will, to the landowners under these projects up to the limit of the water which was unappropriated in 1904. The rights of those homesteaders who acquired their interest under State law and under State constitutions since that date are going to be subject and junior to the rights of the 1940 landowners in a reclamation project.

In other words, the United States Government, because some man in Washington says that the States have fallen down in the administration of some of the rivers, is going to take over the control of the rivers of the West, because the United States Government has invested some money in a reclamation project, and because the reclamation service, 36 years ago, announced that it owned all of the unappropriated waters of the stream. What becomes of the owner of that water, the vested rights, the property rights of your western farmer? Are they going to go for naught? If that thing obtains, all that is going to be left for him to do is to put out the fire, call the dog, and go some other place, or go on relief.

Now, we do not subscribe to that doctrine in the western country.

I am speaking for American citizens in the State of Colorado and in the western country, who have built their homes on the belief that they acquired rights which were inviolable. I do not think that any such preposterous suggestion has ever been asserted in the history of this country. And we do not intend to take it lying down. We believe in the rights of the States, and we do not consider the question of States' rights is a mere academic one; we intend that the property rights of the individual farmers in Colorado on those rivers shall be respected not only by their neighbors, not only by State officials, but by Government officials as well.

Now I have given you this illustration to tell you why the people of Colorado are protesting against the passage of the Cole bill. They feel, with their anticipated great oil production, that unless they protest now they are going to someday meet some such threat as is being presented against their water rights and their ownership of property at Denver, in the North Platte suit.

This is a very important thing. We are talking of the water of those rivers, the very life of the West. Conceivably if this bill, as we think, does actually threaten to violate the rights of the State of Colorado to control its oil-production industry, we may someday find ourselves in a similar threat in connection with oil as we now have with water. We seriously and candidly, but nevertheless earnestly, protest against any further encroachment upon the rights of the States to control and to administer those properties which we think belong to the 48 sovereign States in this great sisterhood as against a Government of delegated powers to which the States have never granted supervisory control over the rights reserved to them under the Constitution. We must preserve our form of government. This bill is contrary to that theory.

Mr. **Cole**. Governor, you have a State statute in Colorado?

Governor **Carr**. Yes, sir.

Mr. **Cole**. Dealing with your petroleum resources?

Governor **Carr**. Yes, sir. Not as detailed perhaps as some of the other States where they have had greater need for more statutes, but Colorado is a member of the compact and is trying to follow in line with proper cooperation and with the interstate regulation of the other oil reservoirs.

Mr. **Cole**. Thank you very much, Governor.

Governor **Carr**. Thank you.

Governor **Phillips**. Governor Miles, of New Mexico, is here and will proceed, if it is the wish of the committee.

Mr. **Cole**. We will be glad to hear Governor Miles.

STATEMENT OF HON. JOHN E. MILES, GOVERNOR OF THE STATE OF NEW MEXICO

Governor **Miles**. Mr. Chairman and gentlemen of the committee——

Mr. **Cole**. Governor, before you proceed, for the benefit of the press, I have released Governor O'Daniel's telegram, if anyone wishes to see it.

Governor Miles, we will be very glad to hear you.

Governor **Miles**. Mr. Chairman and members of the committee: In preparing my statement I have endeavored to be as brief as possible and to express our objections to the bill. It is not my intention to try to impose upon your time. I am sure that a lot of technical information will follow, and I want to assure you at this time that I will not attempt to qualify as an expert along this line.

Public sentiment in New Mexico, the State in which I have the honor of being Governor, is almost unanimous in its opposition to the bill under consideration by this committee.

The prosperity of our State is preponderantly dependent upon the stability of the petroleum industry. Oil is the very lifeblood of our economic welfare. Being dependent upon the industry, we are fearful of the revolutionary changes proposed by this bill.

In appearing here I am not undertaking to state in detail the conservation achievements of New Mexico, as such considerations will be dealt with fully at a later date by other witnesses.

As a State our attitude toward the oil industry has been one of cooperation rather than coercion. Through experience we have learned that differences of opinion most readily disappear around a conference table and consequently have actively supported the interstate oil compact from its inception.

Our conservation statute of 1935 has been heralded as a model one, and we believe that it is being enforced with efficiency, economy, and understanding. Later testimony will, I believe, show that New Mexico is conserving its petroleum resources effectively, and it is our desire that we continue our own program rather than surrender further authority to the Federal Government.

It cannot be questioned that progress in State control has kept pace with changing technical concepts as developed within the industry nor can it be denied that constant improvements has taken place in the administering of the waste statutes in most of the oil-producing States.

The constantly improving standards of thrift and efficiency in the oil industry under State control during the past 10 years represent one of the outstanding phenomena of a decade. Not only was the consumer furnished a greatly improved product at a 20 percent lower price, but the industry kept pace with a 32 percent demand increase and built up its reserves from 9 to 16 billions of barrels. I have, moreover, been told that within a slightly longer period the amount of preventable waste in the production of oil has been reduced from nearly 30 percent to somewhat over 1 percent. Surely it cannot be the contention of the proponents of this bill that in the face of such a record it should now devolve upon a new and untried Federal bureau to supervise this last remaining vestige of a task so admirably prosecuted.

Can it be in the name of an emergency or crisis that the proponents of this legislation ask its passage? I think not, for we are dealing with that American industry which has most successfully weathered the depression and which asks for no bounty from the Government. It employs a million satisfied workers and pays 10 percent of our total tax bill. I can think of no industry for which a lesser emergency exists.

In order that we do not lose perspective, let us analyze the 1 or 1.5 percent of waste that is said to occur still in the production of oil. Based upon the future United States reserves this would amount to possibly as much as 200,000,000 barrels, or about 57 days' supply. If, as Government publications indicate, our 2,500,000,000 tons of bituminous coal can be converted by known processes into several thousand years' supply of petroleum, the significance of this present waste might appear more academic than real.

However, the leaving of this wasted oil in the ground will set forward by some 2 months the day when the first shift must be made from crude oil to oil recovered from coal. I have been unable to ascertain the probable future cost of recovering oil from coal, but I understand that at the present time it is from two to three times that of producing from crude oil. It is likely that the present cost of liquifying coal will be drastically reduced, but assuming that no material reduction will take place within the next 10 or 15 years, it might be supposed that the increased cost of securing the 200,000,000 barrels from coal would in some manner be passed on to the ultimate consumer.

If such increased cost were to be spread over all of the gasoline to be produced from our present reserves, it would amount to something less than three-quarters of a mill per gallon. I doubt that the consumer would regard this as excessive, nor can I picture him, if possessed with full knowledge of the issues involved, as lending much support to the passage of this legislation.

I, for one, am seriously concerned over the elimination of all possible waste still existing, and in this I am sure that I speak for most of the oil-producing States. As I see it, however, it is the States themselves, unhampered by any question as to the legality of their police power in the allocation of production, which are eminently fitted to carry on this endeavor. The Federal Government has the power to regulate commerce and in this field its authority is supreme.

On the other hand, it has been generally recognized that the Federal Government has no authorized control in the field of production, as this sphere of activity is clearly the function of the State under its exercise of the police power.

The State of New Mexico and other States have accepted their responsibility in the conservation of petroleum, have enacted conservation laws, and have undertaken effective administration of such laws. Through the coperation of the industry, waste has been reduced and progress made continuous. There is no reason for the assumption by the Federal Government of recognized functions of the State government in this regard. In my judgment the assumption by the Federal Government of this function results in the centralization of power and authority at Washington which can better be exercised locally in the States where the oil is produced. This bill centralizes in a Commissioner in Washington the power to set up and enforce conservation standards in all of the oil-producing States, and under its provisions vests arbitrary power and authority in the Commissioner free from the normal protective restraints of the courts. Either the States' regulatory bodies must follow the dictates of the Commissioner or yield the field to him. The whole procedure is one of breaking down local and State authority and the centralizing and piling up at Washington in the Central Government of arbitrary powers of control, which inevitably leads to abuses in administration, to a deprivation of freedom of action, to expensive and costly operations on the part of the industry, and ultimately to a loss of freedom of action.

In conclusion I must confess to a total lack of faith in the benefits to be derived from the regimentation of either industry or State government. On the contrary, I am fearfully impressed by the unmistakable signs of insolvency in both substance and ideals in those countries now subject to an extremely centralized control.

Particularly at this time do we as a nation need that heritage of courage and strength which derives from freedom rather than regimentation.

I thank you, gentlemen.

Mr. Cole. Thank you very much, Governor.

Governor Phillips. If the Chair please, Governor Bailey of the State of Arkansas is present.

Mr. Cole. Governor Bailey, are we to have the pleasure of hearing you now?

STATEMENT OF HON. CARL E. BAILEY, GOVERNOR OF THE STATE OF ARKANSAS

Governor Bailey. Mr. Chairman and gentlemen of the committee, I have read and been told, and I am glad to say that my own observations here this morning confirm that this committee is composed of men who are understanding and intelligent and capable of dealing adequately with this or any other problem.

I should like to warn the committee in advance that what I have to say will not be in a spirit of quarreling with the committee, challenging its authority, or questioning its purposes. I sound this warning because I am sometimes guilty of making an awkward choice of language which is susceptible to misinterpretation.

Recent experiences have caused me to wonder whether the Governors here are Governors of sovereign States or merely the headmen in provinces of certain bureaus. I feel that the members of this committee have a common purpose with the Governors of the States. We are not engaged in any quarrel, in my view of the matter, about who shall have certain authority. On the other hand, it is a discussion of the fundamental aspects of government.

In that situation I am concerned about the large proportion of individual citizens from whom I draw whatever strength I have and from whom you likewise draw whatever strength you have.

With the Government concentrated in Washington or anywhere else, each of my constituents is dwarfed into an individual unit equal to one part in a hundred and thirty million.

In the traditional constitutional system of American government, each one of my constituents in the State of Arkansas represents one unit in two million.

That condition is supported, of course, by the Bill of Rights. I know that in certain atmospheres in this Nation today there is a disposition to smirk and ridicule one as naive who still talks about the verity of the Constitution and the Bill of Rights. Some jitterbug statesmen, I prefer to call them, regard that attitude as quaint. I believe I am expressing the opinion of the people of my State or I would not be here, you may be sure, when I say that we still believe we have a dual republican form of government with assigned areas of responsibility and the Federal Government as the binding force for the sovereign States.

I do not want to be misunderstood. I am not at war with the purposes of the present national administration. I emphasize the purposes. I have applauded and given support to and have complete sympathy with all of the announced purposes of the present administration and the announced purposes of all of the legislation that has come into existence under the influence of that administration; but I have a large difference and a large quarrel with some of the byproducts and incidental aspects of some of that legislation. Upon inspection some of it has rather an amusing aspect. I am thinking now of some legislation recently enacted by Congress in regard to the selection of personnel for public-welfare departments. I had to inspect it recently in order to determine what limitations were placed upon my authority to appoint a member of a merit council. I found that legislation bristling in every sentence, paragraph, and word with astigmatism of politicians. Politicians are tainted according to that enactment of Congress and it takes a year of purification processes before one who has even been near politics is fit to deal with the problems of personnel selection, then if they fail to make the selection according to the notion of somebody in a Washington bureau we are told that the throats of our indigent aged people, crippled children, and other dependent classes will be cut.

This is an example of the conditions which caused me to say a moment ago that I wondered if we are just head men in bureau provinces or really chief executives of sovereign States. On this occasion I wonder too if history will not record this, unless we are actually evolutionizing and changing our theories of government and our system of government, as a caricature of American government. This history can paint a picture of this as an occasion when the ambitions of the heads of Washington bureaus made it necessary for the chief executives of the sovereign States to appear in Washington to plead not for innovations or changes in government, but to plead that the American system of government be allowed to continue. Under this system of government the most remarkable progress of mankind has occurred during the last 150 years—and I am not going into that—but this occasion probably will be regarded as a caricature of the processes of American government because I do not believe that the American people will tolerate the change of the American system by subversive legislative processes.

As I understand it, it is not the intention of the Members of Congress to take a step toward the establishment of communism, nevertheless certain legislation has been enacted which may have that inevitable effect, whatever label may be placed upon it.

I have in mind the experience I had once as prosecuting attorney. It became my painful duty to prosecute a county judge. He was indicted for subornation of perjury. When he was told about his indictment he was very merry. He said, "I am amused. I could not be convicted of that because I do not even know what it is. I never heard of it." But he was convicted. So whatever this legislation may be labeled, an inspection of it in the light of our Constitution and the announced purposes of the founding fathers is necessary in order to determine just what it is.

There is, you know, still a Bill of Rights. Amendment No. 10, which defines the jurisdiction of the States and the jurisdiction of the Federal Government is still a living part of the law of the land.

This bill, as I understand it, is based upon these propositions. (First, however, let me say that I am not going to talk about the merits of the bill because I think the sheer presentation of the bill is the thing that constitutes the challenge to the fundamental purposes of American government. I think that it had its inception in the mind of somebody who sat upon a high hill and surveyed the surrounding areas of national life to see what more he might encompass within the folds of his dictatorial powers. As a result of that survey this bill came into existence and Congress is being called upon to enact it into legislation. I believe the bill in amended form would be more dangerous than in its present frank form.)

First, that oil and gas possibly are necessary to national defense, and second, that they are being wasted.

Consequently some man in the United States, who originally was one of the common herd, even as you and I now are who yet remain in the outlying precincts in Arkansas, Kansas, and elsewhere, when through the transfiguration which so often occurs when a man gets a job in Washington. That transfiguration is the customary decision that he knows more about how to run any business than anybody on earth. The reason he knows more about it is because some kind-hearted politician, Congressman, Senator, President, or Vice President possibly found him unable to make a living and gave him a job here in Washington.

I have read the record of the testimony that has been before you already. I am sure you will agree with me that there has been utter failure to demonstrate that there is any waste occurring. That is readily demonstrable by the fact that today we have 17½ billion barrels of oil reserves in sight as against practically none a few years ago. In 1936 we had 87 million barrels reserve in sight in Arkansas. Today we have 350 million barrels. That was increased just this morning or yesterday afternoon when a new field was brought in east of El Dorado. A 300-barrel well was brought into production according to a telegram just received by Mr. Bailey, chairman of the oil and gas commission of our State.

Mr. COLE. Is that the district represented by Congressman Kitchens?

Governor BAILEY. I think he owns it, as a matter of fact. [Laughter.]

There is to my mind this thing that is immutably true: There has been an assumption in the mind of someone, not a Member of Congress, and not obvious to the public or anybody else, and this assumption occurred before this committee ever heard or thought of this bill, and before it was ever put on paper or in type. I cannot avoid resenting the implications of that assumption. The implications are that one indulging that assumption believes that individual citizens and local officials within the various States are guilty of two or three things:

First, they are incapable of attending to their business; second, they are too dishonest to do so; or third, they are too indolent to attend to their business.

That assumption, of course, is completely refuted by the testimony already presented in support of the measure. If you had adjourned your hearings at the conclusion of the testimony which has already been put into printed form, according to my interpretation of it, it appears to me you could have reached only the conclusion that the enactment of the bill is not justified.

But let us assume that the proponents were able to show that waste is occurring in this vast and most important industry. I say to you that even in that situation this legislation would be utterly and wholly unjustified because of its incidental effect. That incidental effect is the scuttling of the Constitution of the United States and the Bill of Rights.

It is, in order words, a subversive method of changing our system of government.

Now, I do not know that I am loaded with sole responsibility for protecting our system of government, but I do make this point: I do not want it changed until the people say they want it changed. If they want it changed then the change is all right. I can stand a change as well as any other citizen. But they have not said that they want the American system of government changed, and my interpretation of their attitude is that they do not want it changed.

The present instrumentalities for preventing waste of this natural resource are local and State governments. Let us suppose these agencies or instrumentalities are permitting waste and extravagance. It must be admitted that local and State governments are useful instrumentalities. It is unwise and unjustifiable for Congress or anyone else to destroy these instrumentalities we call the sovereign States.

I have a scar on my right thumb that I acquired when I was but 5 years old. My father gave me an air gun. I wanted to see what would happen to that air gun if I tried to pull the trigger with the gun breeched. What happened was that I, childlike, got my thumb in the breech, pulled the trigger, and the breech closed and practically cut off my thumb. My father was, like most proud fathers, rathered hot tempered where his children were concerned. He turned me over to a doctor who happened to be in his little store at the time, and went out on the front porch and destroyed the air gun. Will anybody agree that my father acted rationally in that situation? He destroyed a useful instrumentality whereas he should have preserved the instrumentality and tried to educate and encourage and teach me how to use it safely. All that can be said about the States, if waste of oil is occurring, can be said about shotguns, pistols, and automobiles. Nobody advocates discontinuing construction of highways because people get killed on highways; nobody advocates discontinuing construction of automobiles because they kill people. We have on the contrary an educative and persuasive process under which we attempt to teach people to operate those cars and use those highways safely with due regard to the lives and limbs of themselves and other people.

So, as I see it, regardless of the factual situation about the waste of oil, there can be no justification for the enactment of legislation which will destroy the useful instrumentalities which are the sovereign States.

In my opinion this legislation or legislation such as that under which the Social Security Board is attempting to control the personnel of State welfare departments does not even have the doubtful merit of being politically beneficial to Members of the Congress or the Senate. Some of you may be private citizens again some day and whether you are or not, this legislation gives you nothing with which to acquire any political advantage. You are simply putting yourselves more completely under the domination of that bureau to which you assign the arbitrary authority provided for in the Cole bill. So, in my view, this proposed legislation is utterly unjustified.

Naturally, I heard Chairman Cole's question to those who have appeared before the committee preceding me this morning. I should like to anticipate him by answering some of the questions before he asks them of me. This will serve also to avoid the possibility that I may have been misunderstood in some particular.

So far as I am concerned and so far as my people are concerned—and I think I know how to interpret how they feel—I would rather lose all of the oil and gas in the United States of America than to change our system of government by a subversive process. If it is to be changed, let the people change it. There isn't anything so terrifying after all about the loss of oil and gas. Suppose we did not have any? There was a time when we did not have any. Suppose we gave it up in order to preserve this system of government under which we now live? Men have given even their lives to establish it and preserve it. Life, it seems to me, is more valuable than oil and gas. And, assuming what is not true, that oil and gas are being wasted, I answer Mr. Cole's question about the competition of oil produced in unregulated States: It is said that oil is a wasting resource. Well, I do not know, and I do not think the geologists know either whether it is a wasting resource. In the course of time and nature that oil was obviously produced by nature. I do not think that it is the only intelligent assumption to presume that nature's processes have been arrested and that therefore, no more oil is being produced by the natural processes. I do not know what is going on down under the ground, and I do not think that they could do more than theorize about it. Oil was produced at one time, and if produced at one time what has happened down there under the ground that makes any one sure it is not a continuing production process?

But even so, if Illinois is unregulated, and if California is unregulated, there is all the greater incentive for the State of Arkansas, as a selfish State proposition, to want its own production regulated when also in unregulated States they are likely to have all the bottom hole pressure blown out, thus leaving a large proportion of the oil in the ground. Pressure is what brings the oil to the surface. Regulation is for the purpose of bringing about a recovery of the largest possible percentage of the oil under the surface. We are regulating our production practices, thus we have large stores of oil in nature's storehouse perfectly secure. When those who are profligate about the production of their oil have dissipated their oil resources either by destroying the bottom hole pressure or by flooding the markets with too rapid production, as we did in the Smackover field in Arkansas in the early days of our oil development, they make the remaining supply of oil a dearer product. After the days of their profligacy have passed we will still have our oil in nature's storehouses. We can and will take it out by conservative processes. We then will have the benefit of the larger value that will attach to the remaining oil. So instead of the unregulated States hurting those of us who are practicing conservation, as matter of fact, they are moving us on toward a possible condition under which we will have still a greater advantage in the matter of marketing and the matter of prices for that resource.

I do not know that anything we, the Governors who are here today, may have to say will add anything to your knowledge and your fund of information or assist you in your reasoning. You know as much about the Constitution and our system of government as we could possibly know. This has been my hope, however, that in coming here, fresh from the bosom of the people and the home atmosphere and demonstrating a willingness to stand in public meetings and say that we still believe in the American constitutional system of government, it would help you to realize that the people back home still adhere to the American way of life regardless of some of the synthetic notions, ideas, and proposals that you are fairly submerged by while you are here in Washington endeavoring and attempting to discharge your duties.

I don't believe that it can be demonstrated there is any essential difference between oil as an instrumentality of national defense and coal, the soil of the earth, the forests of the Nation, the water, the game and fish, lead, zinc, steel, silver, gold, bauxite, or any other natural resource.

When the Federal Government or even a State government takes unrestricted control of these natural resources, then we have pure and simple communism. This bill proposes to take control of a resource which belongs to and has been developed by a section of the citizenship of this Nation which has never called on the National Government for any financial aid to their business. If this bill is enacted the precedent is thereby set for complete communizing of our natural resources because there can be no argument made in behalf of this measure which cannot be made upon the basis of factual data available in regard to all other natural resources. Much stronger argument about waste of and the importance of other natural resources to national defense can be made.

If this bill should by some mischance run the gauntlet of legislative processes and become a law, it would symbolize the longest step toward converting our democratic dual system of government into a communistic system by subversive legislative processes.

Now, that is plain language, but it is time to talk plainly, it seems to me, when we are confronted with a situation such as this.

So, my sole purpose here simply is to try to convince you that I am secure in the knowledge that the people of my State are violently opposed to this legislation. They have only recently awakened to the fact that some of the legislation heretofore enacted has incidental penalties which far outweigh the benefits intended. Down home we understood that the present administration's proposals were in line with the idea of applying palliatives for the deficiencies in national policy. The spending and lending program, as we understood it, was for the purpose of preventing immediate misery to large sections of the population which had become submerged and subnormal on account of these faults in national policy while setting in motion the longer-range processes of correcting those faults. We now have come to a realization that the byproducts of the spending and lending program is regimentation of the people under the control and dictatorial direction of bureau heads who never submitted their claims for the right to hold public office to the people of any section of the Nation—and of that we are genuinely fearful. We are terrified. It is most terrifying to stand before a man occupying an office in Washington, far removed from the problems of, and utterly lacking an understanding of the problems of the people, and have him tell you, the executive head of a State government, "You do so and so," or we will cut the throats of those whom you are trying to make provision for. That is the condition today. Every Governor in the United States has been told that very thing. The Governors and the people alike will be told more drastic things if this bill is enacted. I plead with you, in the interest of the same people in whom you are supposed to be interested, to see to it that this bill does not have a favorable recommendation.

I thank you. I shall be glad now to submit myself to questioning.

Mr. Cole. Governor, it was the intention of the committee to visit your State not many weeks ago when we were in New Orleans holding hearings. At that time we were going to go to Shreveport and from there into Arkansas. We were very much disappointed in not being able to do so. We hope later to have an opportunity to inspect some of the fields in your State, because I think I can say for some of the committee, certainly for myself, that if all of the oil-producing States of this country had statutes as well drawn as the law of Arkansas, and were administering them as I understand to be the case in the major fields of your State, I do not think we would have as much reason to be here.

Governor Bailey. Well, that is a very generous statement. I appreciate it. I in turn am sorry that your committee did not get into Arkansas to inspect our fields, because we would have found time to let you inspect some other interesting features in our State in addition to the oil fields.

Mr. COLE. Your State statute has no reference whatsoever to market demands?

Governor BAILEY. No, sir.

Mr. COLE. As it is found in the statutes of all other States?

Governor BAILEY. No, sir; it does not?

Mr. COLE. In other words, you seem to look more to the conservation principle and prevention of waste of oil and gas than to the stabilization of the industry as other statutes have in mind.

Governor BAILEY. Yes, sir. Well, Mr. Chairman, you understand our statute was enacted in 1939. We had, therefore, the privilege of observing the faults in the statutes of the other States. We thereby avoided the faults and included the meritorious features of the statutes of other States in our own. I think we owe our acceptable statute and the efficient administration of it largely to the pioneering which has been done by other States.

Mr. COLE. I understood you, Governor, to say that you see no difference in State control and Federal control of oil and gas resources from that of timber, water, soil, and a number of other things.

Governor BAILEY. I said no essential difference, Mr. Chairman. There is possibly a slight difference between oil and timber, because timber is now not regarded as a wasting resource. When I was in the timber business only a few years ago, we did think it was necessary to devastate forests in order to utilize the trees. We know better than that today. I say there is essential similarity because I contend that it is not a categorical fact that oil is a wasting resource. I think the processes of nature are continuing in some measure to replenish the supply of oil underneath the surface of the earth.

Mr. COLE. Does your State have any statute dealing with any other natural resource other than gas and oil?

Governor BAILEY. Yes.

Mr. COLE. What?

Governor BAILEY. We were the first State in the Union to enact legislation under which the soil conservation districts have been brought into existence. We have the largest number and the largest area in soil conservation districts of any State in the Union. Under that legislation, however, the landowner is permitted to vote on whether he shall have soil conservation practices adopted on his land. He is not forced to do it.

We have a forestry conservation program. A forestry commission in our State spends practically a quarter of a million dollars per year on forestry conservation. One hundred thousand dollars of that is State taxes. Our pine area in south Arkansas is now producing more timber than is being cut. These areas are supporting a variety of enterprises, including furniture mills, paper mills, and other woodworking industries. The acreage included is approximately 13,000,000. Within the State, furthermore, we have two national forests: The Ouachita on the south side of the Arkansas River and the Ozark on the north side. In these national forests the Federal Government is conserving timber resources. Generally the State program of forestry conservation is one of cooperation with the Federal Government and the private owners.

A more complete answer to your question might be this statement: In 1937 the General Assembly of our State enacted every piece of legislation that was indicated as needed or desirable for complete cooperation with national departments. Without a single exception we enacted all of the measures suggested, first modifying them to suit local conditions and our State constitution. From practically all of this legislation we have vastly benefited. The only exception which comes to my mind is the low-cost housing program. However, applications now have been made to the Housing Authority, and it appears that we will in the near future by this process have some of our substandard housing conditions corrected. We then will be able to say without exception that we have benefited through the State's cooperation with all of these national programs—this includes rural electrification, soil conservation, conservation of water resources, and so on, without going into detail. From this you will perceive that I am not opposed to the use of the vast powers of the Federal Government for taxing and borrowing to procure the means with which to palliate economic deficiencies temporarily. However, I do feel that the national administration should spend and lend for palliation only temporarily while making a real effort to bring about changes in national policy which ultimately would make it possible for the people, through their local governmental agencies, to supply more or less those things which are needed for the public welfare. If the people of our State had the income with which to do it, any sane man knows that we would utilize that income to procure the things which the people need. We would not want anybody to give or lend us the money with which to procure those things.

Mr. COLE. What the Federal Government has in mind through conservation of forests and soil in the States is pretty much in agreement with what you also have in your State. So there is little disagreement. You are getting along all right in the enforcement of your State oil and gas legislation.

Governor BAILEY. Yes, sir.

Mr. COLE. Where you take into consideration, I believe, solely the physical characteristics of the various fields, determine the total market demand, and then you establish a definite formula of guarding the production of the various fields, and then, in turn, allocate to the individual wells?

Governor BAILEY. Yes. I was about to say "yes" to that; but I think it is a little too involved and technical for me to answer. Mr. O. C. Bailey is here. He is chairman of our commission. I do not want to be drawn into a technical field where the elements will be over my head.

Mr. COLE. I do not think that is possible, Governor. The chairman of your commission is here, and he will be a witness from your State later?

Governor BAILEY. Yes, sir.

Mr. COLE. I have been rather under the impression that so far as the requirements such as we find we are in agreement pertaining to forestry, soil conservation, and other activities of that character are concerned, with which you are in agreement, that the requirements established in the bill before us as applied to prevention of waste, prevention of waste of oil and gas in your State would be entirely in agreement with that outlined by your own law.

Governor BAILEY. Oh, Mr. Chairman, they are not in line. There is a very fundamental difference. Under this bill some man here in Washington will say to us, the people, what we must do, and from that we would have no right of appeal. Under the soil-conservation and the forestry conservation practices, even State authorities do not tell the people what they must do. They tell them, "You have this opportunity to have this expert assistance and this money with which to do these things that we tell you are good things. You ought to conserve your topsoil." They readily agree, and they vote themselves into soil-conservation districts.

The timber owners in the timber area actually make a contribution of 2 cents per acre to be used for conservation of their forests; but we cannot and do not force them to do it. That is entirely up to their own judgment. It is still, you see, the people's Government. I say that if the people want to be extravagant—the king can do no wrong—and they are the sovereign. If they want to be extravagant, they have that right under our system of government. I have no right to and there is no other man who can say to the people, "You cannot do what you want to." If the people want to devastate their forests, they have the right to do it, though it is not a sensible thing to do, and they ought to be educated and persuaded not to do it.

Mr. Cole. But, Governor, are you familiar enough with the provisions of the bill before you to say whether if this bill became a law it would ask the people of Arkansas to do any more than you are now asking them to do, insofar as gas and oil production is concerned?

Governor Bailey. Yes, sir.

Mr. Cole. What?

Governor Bailey. It would not ask them to do more but they would be required to do more because today when the oil and gas commission sets an arbitrary production quota and tells the people what they must do, that comes at the end of a hearing. Our law requires the office headquarters of the oil and gas commission to be immediately in the oil field down there in the county seat of one of the oil-producing counties. The people concerned can and do come in there in accordance with the traditional American system of government and have hearings. Everybody is heard and the record is made. Anybody who is displeased with the decision of the commission can appeal to the courts and have the courts retry the issues, even through the Supreme Court of the State of Arkansas and under certain conditions and on certain issues through the Federal courts. Under the provisions of this bill it would not be possible to get into any court, and even if a court were available, you must recognize that there are certain physical aspects attendant upon the concentration of power in Washington which make concentration un-American. It is an expensive thing to come to Washington. It takes time. The man who is not busy enough that he cannot afford to lose the time does not have the means with which to make repeated trips to Washington and to hire counsel to represent him in special forums from which there is no appeal. Those who have the means to come to Washington, on the other hand, have responsibilities which make it inadvisable and inexpedient for them to waste and lose the amount of time used to come up here.

When I, from the capital city of Arkansas—Little Rock—come to Washington, I have to charge off a week from my responsibilities. There is just no way of getting away from it, because it takes 2 nights and a day to come up here on a train, and it takes that much time to go back. Well, if I attend to any business at all while here I have consumed a week. That is another answer to your question, also. In other words, under the provisions of this bill, you take government physically away from the bosom of the people and deposit it up here where the people cannot get to it. Therefore, even if this proposed enactment created exactly the same conditions as is created by State law, still it would not be justified because of the physical handicaps which would be necessarily involved.

Mr. COLE. Are there any further questions? Thank you, Governor.

Governor BAILEY. Thank you.

Mr. COLE. Governor Phillips, the House convenes at 12 o'clock. I do not know whether we will be able to hold a session this afternoon. I was wondering what engagements you and the other gentlemen have and whether you would rather keep those engagements or have a meeting?

Governor PHILLIPS. We are here to await your convenience, and we will remain another day or whatever you desire.

We only have the Governors of Arizona and Montana, who will not take as much time as some of the others. I do not know whether Governor Rivers will be here or not. Governor Smith, of Wyoming, and myself will make statements and then tomorrow can follow the statements from other Governors who are not personally able to be present; and then they will be followed immediately by the regulatory bodies of these States and other States.

Mr. COLE. They have short statements, you say?

Governor PHILLIPS. I have not gone over them; I do not know.

Mr. COLE. That is what I understood you to say.

Governor PHILLIPS. I think they will be much shorter, Mr. Chairman.

Governor AYERS. I will not take more than about 10 or 12½ minutes, Mr. Chairman.

Mr. COLE. Governor Ayers is a former distinguished Member of the House. We will give you all day if you want it, Governor.

Governor AYERS. I am much obliged to you, Mr. Chairman, but that will not be necessary.

Mr. COLE. We will hear Governor Ayers right now. Take all of the time you want.

STATEMENT OF HON. ROY E. AYERS, GOVERNOR OF THE STATE OF MONTANA

Governor AYERS. Mr. Chairman and gentlemen of this subcommittee, I am glad to see all of you again, and I am glad to see the chairman (Mr. Lea) of the whole committee here this morning; I am also glad to see the faithful senior member of this committee (Mr. Crosser). With much pleasure do I remember, while a Member of Congress, having talked with all of you about many problems of governments. And today I am just going to talk to you again and not talk at you; hence I am just going to try for a little while to be one of you again.

My "text"—that is a good word, isn't it?—will be, What Do the People Want? And, answering it briefly, permit me to say, they want less legislation, less direction, and more opportunity to work out their own problems.

Now, Mr. Chairman, I am an administration man. I was an administration man while I was here in Congress. I am faithful to the administration. What I say here I hope will be construed to be what I firmly believe for the benefit of the administration as I see conditions today. This administration is my administration. I am a part of it. Although I am not officially connected with the national administration any more, yet as the chief executive of one of the Nation's 48 separate units (the States), I am both as a State official and in a personal capacity doing all I can to make the national administration a success and my remarks here and now will be directed to that end.

With that purpose in mind, I say that I believe the time has come when the people are demanding less legislation, less interference, and less direction from the National Government, and more opportunity to work out their own problems. The National Government with its remedial legislation since March 4, 1933, has actually saved us as a people, but the time is here when we must get back to our own responsibilities and be our own selves again, in order that the recovery program promulgated, supported, and pushed forward by the National Government may become permanent. To do that, don't misunderstand me to mean that the Government shall forthwith withdraw and discontinue its so-well-meant and so-effective help; however, what we need now is not more law, not more power, and not more direction by the Government, but less law, and less direction to the end that we have more modifications and more consolidations, rather than increased additions and multiplications of governmental authority.

We have too many national "laws of don't," and that didn't start with this administration either; and we have too much national interference with private industry and too much national control of what the people determine to be entirely State affairs.

I will be brief, but that you may get my viewpoint, I wish to call your attention, first, to one of the outstanding "laws of don't," a law which the Government itself finally corrected. Then, second, as to Government interference in private business, private industry, I shall call your attention to the outstanding instance of all time, in which instance the Government again corrected the error, so far as law is concerned, but only after irreparable injury had been done to, one of the most outstanding, nationwide industries. And, third, I shall rely upon this committee's own outstanding good judgment in the protection of the sovereign right of the States in the management and direction of their own affairs. These things are material arguments against the "reporting out" of the Cole bill by this committee.

Now, first, as to the "laws of don't," all of you committee members will remember what happened in this Nation and how a general disregard of law grew up while we had a constitutional provision, known as the eighteenth amendment, and to enforce it, we had all kinds of laws saying "don't" and "thou shalt not," the principal one of which was the Volstead Act. But they just didn't work. The American people do not stand for a "don't" law unless it has to do with the prevention of some actual wrongdoing, in which event they get back of it and see that it is enforced to the limit.

Now, let me ask you in all seriousness, what conscious wrong has been shown to exist requiring that the Cole bill be given life to prevent such wrong; or, if by any stretch of the imagination, any conscious wrong is shown to exist in the course of oil production, has there been anything shown to indicate that the State or States in which the wrong exists cannot be better corrected by the State or States themselves than by enactment of the Cole bill?

The second objecion against the instant bill, as I heretofore stated, is Government interference and control of private business, private industry. We all remember when the Government took over the control of the railroads of this country. And since you have a railroader, and a real one, on this committee (Mr. Crosser), I am sure he can discuss this matter with you in committee conference more ably than I or anyone here. I shall repose my confidence in him to do that when you have the subject of Government control under consideration. However, I shall briefly call your attention to some outstanding features in that respect. It was wartime then and if ever in all our history the Government had a right to take over a private industry, it had it then, and if it would have support in doing such a thing, it should have had had it then. Yet, during that period and for a long time after the railroads were restored to their rightful owners, the courts of this country were literally swamped with litigation in which McAdoo and then Hines, as Directors General of Railroads, were defendants in more litigation than was ever had in this country on any one subject. I know that as a fact, for I was on a trial bench in my State then and I followed it, both in State and Federal courts. A great portion of this litigation was encouraged by railroaders themselves and by shippers and patrons, brought on in order to discourage the Government in its operation of private industry and to encourage it to turn the railroads back to their rightful owners at the earliest possible moment. This demonstrated to us that the people did not approve of that class of Government control and Government administration of private affairs.

Now, let me ask you what has grown out of the situation in that instance? Well, I can answer that question too, and very briefly. It put some of the railroads out of existence entirely; others into receiverships; it has put others actually on relief—yes; they are actually leaning on shovel handles—they are on relief in fact; and others, the most successful of them all, have established a credit rating with Jesse Jones down here at the Reconstruction Finance Corporation, and that is the only reason they are successful; private money was not, and is not now, available for that purpose.

Everyone well knows the place the railroads have always taken in the industrial world, and no one ever believed, or even had an idea, that the control which was exerted over them at the time it was exerted. could have started them on a downward trail. As a matter of fact, a great agitation was prevalent then for a continued Government control, and even for a Government ownership of railroads; but the Congress was too wise to take any such step. That experience, and other experiences, have taught us, and I am sure we have learned, that such things just don't fit into our scheme of governmental affairs.

Now, the oil industry, the second largest industry in America, as I recall it, second only to agriculture, will be subjected, if the Cole bill passes, to run the gauntlet of every class of Federal control and management which has not heretofore proven successful. Surely we do not desire to start on an experimental tour with an industry so far reaching as the oil industry. There are thousands upon thousands of byproducts of mineral oil. It is found upon the shelves of every drug store, every grocery store, and every dime store; it is in every home medicine cabinet, on every dining table; there is not a single girl clerk here in Washington who does not contribute her bit to gasoline, which is the highest of the oil products. She rides the taxis or drives her own car. The hand of labor and the skill of the expert commences with the discovery of the field and the drilling of the well, and it ends in the use of the refined product. As a matter of fact, the industry affects practically every citizen of the country.

Mr. Cole. You can hardly speak of anyone who is not affected.

Governor Ayers. Really, Mr. Chairman, that is true. It is far reaching. I am told that doctors are now prescribing castor oil which comes from the ground.

Now, Mr. Chairman, since we have all agreed that the oil industry is so far reaching, surely no person desires it to get into the condition of the railroads—on relief.

Third, is the question of the right of the State to deal with and handle its own affairs and of those things originating within its borders and that are developed under its authority and that are protected by its police power and that become a success by reason of the primary knowledge and interest of its citizens. I am sure this honorable committee will agree that we have authority under our Constitution and under our form of government to the right of jurisdiction unless we fail in the purpose designed for the benefit of all. And the only way we could do that is to commit waste of a natural resource. And unless we are actually committing waste in this instance we have and should retain jurisdiction. We have such right, among other reasons, by reason of the law of discovery and by reason of the law of pursuit, so long, at least, as we do not abuse such right. While I make this statement I am mindful of the Interstate Commerce Commission decisions declaring that oil is a subject of interstate commerce from the cylinder of the pump at the bottom of the well all the way to the consumer. Yet the control of the industry proposed by the Cole bill cannot exist under any theory of law now existing, hence the Cole bill.

So now, let us discuss briefly, how, if in any way, have we failed to protect a natural resource, and if we have failed, how in the name of conservation can interstate commerce interfere?

We as States do not claim to be perfect any more than the National Government can claim to be perfect, nor any more than any individual can claim to be perfect. But we, as States, like the Government, do claim that we will correct our errors when we know them and when we have the opportunity to do so. And that same rule may go on down to the individual, which after all, makes up the State and makes up the Government—yes, after all, we as officers of the State and of the Government, are responsible to the individual, the people, in whom I, and I am sure you have every confidence for this is a Government in which constituted authority is derived from the people.

And now, since we have agreed that practically all of the people are affected by the oil industry of this country, I believe we may further agree that the overwhelming majority of the people affected are consumers, and who, so far, has appeared before this committee in behalf of the consumer? While I am not desirous of taking in too much territory, that is ofttimes more dangerous to the person who attempts it than otherwise. As a matter of fact, a then Congressman from my State and while a member of this committee, and not so long ago either, brought disaster upon himself by attempting to take care of the affairs up in New Jersey and over in Spain—so with his experiences fresh in mind, I shall try not to go too far afield. Yet, I do think somebody ought to mention what the Cole bill will do to the consumer of the products of the oil industry. Just briefly, I am sure you will agree with me that from gasoline, lubricants and hard oils at the top on down to barn paint and shoe blacking, it will raise the cost to all consumers because naturally the cost of the administration of the things set forth in this bill will be passed on to the consumer; that is the ordinary sequence of all things of this kind. As administrative boards, bureaus and commissions, and as executive and administrative offices and officers are created to effect the functioning of this law. the expenses thereof just naturally go on down to the pocketbook of the consumer. It always has been that way and it just seems that no cure has been offered yet for it, so we will and must expect it in this instance. Let the camel get his head under the tent and he is going to see the show at the expense of those who bought tickets.

The States are now receiving the benefit of the extensive research of the Geological Survey and of the National Bureau of Mines, all of which is very beneficial to the States and all of which is duly appreciated by them. In most of the public land States, the Government rules of drilling, or rules of development whether oil is produced or not, and the rules of production if the well is productive, have been adopted by the States, and if any error occurs there in the matter of conservation which may amount to waste, the State can be blamed only for having followed the Government. In all public land States where oil is produced on public land, the Government is a lessor, and I have never yet heard of it having made complaint about waste.

Surely it has not in my own State, and there it is one of the large lessors and has the Bureau of Mines agents in the fields at all times. I believe that individuals as lessors are like the Government as lessors. If they see or know of waste being committed, they will be the first to make complaint and when that complaint is made and when the State fails to correct it, then and only then should the Government step in and say, "Thou shalt not." But I cannot conceive that any State will sit idly by and see any of its natural resources wasted.

The wide rush to frontiers is a thing of the past. We have learned the folly of slaughtering millions of buffaloes for their hides, because they have become extinct; we have learned the folly of plowing up the lands that nature had created to raise its own grasses, because by so doing we developed the Dust Bowl; we have learned the folly of the promiscuous cutting off and permitting the uncurbed fires in our forests; we have learned the benefit of curbing our waters near their source for reclaiming and benefiting of the agricultural and livestock industries, and for flood control further down the rivers; likewise, we have learned the necessity of conserving our oil and gas for present use and for the benefit of posterity. You don't hear any more of open earth reservoirs for crude oil. But you do hear of every act that is possible being practiced in every State for the conservation of its oil and gas and all other natural resources. So now I cannot see why with this great education program going on that we should pass any more "laws of don't," nor enact any more laws taking authority from the States. In aid of this educational program we have, and we welcome the services of the Geological Survey, of the Biological Survey, of the Bureau of Mines, of the Irrigation and Reclamation Service, of the National Park Service, of the Bureau of Public Roads, and many other governmental agencies which are designed to help, and while the title of this proposed law (the Cole bill) is along that line, the text of it is absolutely different. The text is a "law of don'ts"; it is a law of "thou shalt not"; it is a law of absolute control in which the executive appointed thereunder shall have absolute power from which there is no appeal. And to me as a lawyer and an ex judge, it just doesn't seem to be in accord with the fundamental legal principles of this country.

Having absolute faith in the people and realizing that States are made up of people, I cannot conceive of any State running wild, or even half-wild, or even just a little wild at this day and age in the waste of any of its natural resources. The people must have first in their minds the conservation of the things which make their State a success and if we let them do it, I am sure they are going to feel a whole lot better among themselves, and as a whole they are going to feel a whole lot better toward the Federal Government. And if the Federal Government knows of some mistake in this respect that the State is making, I am sure that the State, which is the people, will feel a lot better if it is called to their attention by the Government through its instrumentalities, rather than having the Government step in upon them and take or attempt to take their authority from them.

After all, governmental authority from which springs government control and government regulation is, in this country derived from the consent of the governed, and an unjust use if it is bad.

We, the Governors here today, are answerable back to our people, and don't you suppose we know what they desire in our respective States? And while we are here talking primarily for them, we must in order to completely do so, talk for the great mass of consumers in all the other States, for if it were not for such consumers, our products would not be salable, we would not have any market; hence, after all, the program is Nation-wide. We have the product in our State and you in the other States have the purchase power, so let us work together. We will not knowingly waste our product for we hope to transport and sell it to you in other States at a price you can afford to pay, and there is where the Interstate Commerce fits in—from and after the time it is produced and on until it reaches the consumer.

If, as is proposed by this bill, in the name of conservation, a commissioner is appointed from whose order there is no appeal, by the authority of the bill he can tell us what to produce and what not to produce, and when to produce it and when not to produce it: he can also tell us when and for what purpose the product can be used. He can say to the driver of a pleasure car, "don't," or "thou shalt not," or "we must conserve this product for other purposes." Then he could go on and without any appeal on my part, tell me that I cannot use lubricants or crude-oil products to run the tractor on my ranch and that would force me back to the work horse. Well, maybe that would be better so far as I am personally concerned, because my ranch is adapted to the raising of horses and I dont believe there is any oil under it. But would that be right or proper or even decent as a governmental policy? Yet I cannot find anything in this bill that would prevent it being done if the commissioner appointed to administer it thought it should be done.

Now, what is all the hurry about the passage of this bill? Can it be that it is some oil trust secretly operating and looking for special favors in the way of buying up fields that are not permitted to produce, or can it be a concerted effort on the part of somebody or some organization to build up another all-powerful Government bureau here in Washington? Well, I will not attempt to answer that question. I do not know. Either one is bad enough. But I do know that mighty few Members of Congress are hysterical about creating any more bureaus, boards, or commissions, and I feel sure no spontaneous waste has prompted this move, and in view of all I can learn, I feel sure there is no particular hurry about the passage of this legislation. I have read the testimony of those who testified before this committee heretofore, and in that testimony I find a report by the National Geological Survey prepared by Dr. Misner, long-time geologist of the Geological Survey, wherein he and his associates say, "Should coal be called upon to supply the demands now met by oil and gas, the coal reserves of the United States would, according to independent estimates by Hendricks and Fieldner, last about 2,000 years" (p. 104, first volume, hearings on H. R. 7372, Cole bill). Those estimates, together with the present estimates of mineral oil, as I am told, which has in sight between 17 and 20 years of production, would mean that we can see ahead for from 2,017 to 2,020 years of oil and gas production. So I just cannot see why we should not take a little time to discuss this matter with the States, rather than to hasten this legislation on to the statute books. The States, together with the Geological Survey, the Bureau of Mines, and the oil industry itself are getting the job done pretty well, and doggoned if I can see why they should not be helped to perfect the job, rather than to take it entirely out of their hands and create a bureau of "don'ts" and "musts."

In my own State (Montana), wasteful practices in the production of either gas and oil have not been practiced to my knowledge. If they have, the Government is at fault and I feel sure it is not at fault, and this is why I feel that way, namely: Commercial production was brought in in the State concurrent with the passing of the Federal permit law for production on public lands in February 1920. We then adopted the rules prescribed under it by the Interior Department, so far as development was concerned. And in 1925 we enacted a law in conformity with the Government law providing that our public utility commission should supervise the drilling, the abandonment, the plugging, and the supervision of production. In addition to that, we have always cooperated with the Bureau of Mines of the Interior Department which has offices in our fields. Hence in the eyes of the United States Government and particularly if it is looking through the glasses of the Interior Department, we could not have committed waste.

In 1933 after the enactment of the National Industry Recovery Act, which incorporated provisions intended to control production, transportation, and storage of crude products, at a special session of our legislature there was created an oil conservation board against which no word has been said by the United States Government, although it is a large lessor of producing lands in our State.

Now, Mr. Chairman, don't misunderstand me. We still need the help of the National Geological Survey and of the National Bureau of Mines. They are interested in us and we are interested in them. But so far as this class of legislation is concerned, the Cole bill, we are actually howling to be let alone. We are actually howling to be permitted to pursue our own industries and to work out and settle our own problems. It is our work, it is our lives, and we desire to work out our own salvation among ourselves and with those with whom we deal and with whom we compete. We will not intentionally commit waste of oil or gas or any other of our national resources, and if any waste should, through our ignorance, be known to any Government instrumentality or agency, we would have it call the same to our attention to the end that we may hasten to correct it.

I am glad to have seen you all again. Thanks for your consideration of these few remarks.

Mr. Cole. We are glad to have seen you again, Governor, and indeed glad to hear from you.

Governor Smith, of Wyoming, I understand is next, then Governor Phillips, and then you will close.

Governor Phillips. Yes, sir.

Mr. Cole. We will be glad to hear from you, Governor Smith.

STATEMENT OF HON. NELS H. SMITH, GOVERNOR OF THE STATE OF WYOMING

Governor Smith. Mr. Chairman and members of the committee: The Constitution of the United States provides that the Federal Government shall guarantee to every State in the Union a republican form of government. The courts have construed this to mean that the State is supreme within its own borders and shall not be interfered with by either the Federal Government or any foreign State or government.

The act of admission, admitting Wyoming to Statehood, gives to the State certain lands for the use of the State for educational and other purposes.

The State of Wyoming owns, as a sovereign State, the lands granted by the Federal Government, and has the exclusive jurisdiction of, and rights to, these lands. This attempted legislation on the part of the Federal Government destroys that right by taking from the States the power and authority to regulate and provide for the operation of these State lands. The State of Wyoming receives royalties from the production of oil and gas upon their lands, and this proposed legislation would place in the hands of the Federal Government the right to decrease those royalties or to do away with them altogether. Such a power was never contemplated by the Constitution of the United States, the act of admission, or the constitution of the State of Wyoming, and is in direct violation of our system of dual government, namely, that the Federal Government is supreme in the affairs of the United States and the States are supreme in their internal affairs.

Therefore the people of Wyoming, whom I represent, are opposed to the Federal Government interfering with their State's rights.

Mr. COLE. Thank you, Governor.

Governor SMITH. Thank you.

Mr. COLE. Governor Phillips, will you be available this afternoon, or would you rather go on tomorrow morning?

Governor PHILLIPS. Whichever you wish, Mr. Chairman. I will be here tomorrow seeing about some other affairs for the State.

Mr. COLE. I understood that you had some other appointments for this afternoon.

Governor PHILLIPS. I would just as soon go over until tomorrow, but whatever you wish will be satisfactory with me.

Mr. COLE. Well, I do not know that this is correct, because you have some other engagements, I understand.

Governor PHILLIPS. I do have this afternoon; yes, sir. The only thing, in making those engagements, if I might say so now, as Oklahoma wishes to present its case, we do not feel that there is any place else in the world to go except before the men of this committee, and we feel under our theory of government we will get justice and proper consideraiton right here, but as a matter of courtesy we do want to make our calls.

Mr. COLE. That is very kind of you. We want you to see something of Washington other than this committee room while you are here.

At this point I will place in the record a telegram from Gov. W. Lee O'Daniel, of the State of Texas.

(The telegram referred to is as follows:)

[Telegram]

AUSTIN, TEX., *February 5, 1940.*

CHAIRMAN, COMMITTEE ON INTERSTATE AND FOREIGN COMMERCE,
House of Representatives.

As Governor of the State of Texas, I am opposed to the principle of legislation proposed in H. R. 7372. I see no necessity for legislation which would transfer from the State to the Federal Government the power to regulate and control the production and conservation of any of our State natural resources. I believe the interest of all our citizens will be better served if we seek to improve and extend the cooperation between the various States rather than to completely destroy all State control and turn the task over to the Federal Government. The State of Texas has been endowed with these great natural resources and those of us who live in this State certainly should know more about our own natural resources than folks in States where no such resources exist, and we should not be deprived of our right to regulate our own State affairs pertaining to these natural resources. Those who now regulate these things are chosen from our 6,000,000 population in the most fair and modern democratic manner by the sovereign voters of Texas. In addition to believing in State's rights we also recognize the desirability of a brotherly spirit of cooperation with the few other States which have similar problems, and have endeavored to cooperate with such States in a fair and just manner and intend to continue this policy. For these reasons and on behalf of what I consider the best interests of all of the citizens of the State of Texas, I am opposed to the principle of legislation proposed in H. R. 7372.

W. LEE O'DANIEL,
Governor.

Mr. Cole. I also have a telegram signed by Governor Paul B. Johnson of Mississippi. Governor Johnson was in New Orleans to appear personally before the committee. He finds it impossible to be here today, because his legislature is in session.

(The telegram referred to is as follows:)

[Telegram]

Jackson, Miss., *February 5, 1940.*

Hon. W. P. Cole, Jr.,
Committee on Interstate and Foreign Commerce,
Washington, D. C.

My legislature is in session; Senator Cook's death had greatly interfered with business; my plans were made for me to go to Washington to appear before your committee today. On account of the situation in the legislature, very important matters that claim my attention tomorrow will make it impossible for me to attend meeting. We are now preparing conservation bill which will conserve oil of Mississippi. We are trying to profit by mistakes made by other States in drafting our bill. I am very much opposed to the Cole bill and earnestly pray for its defeat. I regret more than I can express my inability to appear before you tomorrow.

Paul B. Johnson,
Governor.

Mr. Cole. I also have a letter from the Department of Conservation, State of Louisiana, together with a statement from the commission.

(The letter and statement referred to are as follows:)

State of Louisiana,
Department of Conservation,
New Orleans, January 31, 1940.

Hon. William P. Cole, Jr.,
Chairman, Special Subcommittee on Petroleum Investigation.
House of Representatives, Washington, D. C.

Dear Mr. Cole: This acknowledges your letter of January 10, which came during my absence from the office.

Inasmuch as I am ill with influenza, it will be impossible to attend the hearings in Washington on February 5, 1940. I am, however, mailing you herewith a statement which might be read and placed in the record.

With kindest personal regards and best wishes, I am,

Very truly yours,

Ernest S. Clements, *Commissioner.*

Statement of Ernest S. Clements to the Subcommittee of the Interstate and Foreign Commerce Committee, United States House of Representatives

Mr. Chairman, and members of the committee, as commissioner of the Department of Conservation of the State of Louisiana, I am in fairly close contact with production and other branches of the petroleum industry in this State. I am familiar with some of their problems. The question as to whether production may be regulated and prices stabilized by Federal control of interstate commerce in petroleum products has been debated at some length.

I will leave the discussion of technical considerations involved to those with more highly specialized talents than mine. I would like to point out some of the practical advantages of State regulation of the petroleum industry.

I think the representatives of the several branches of the industry will agree with me that there has been a continuous improvement in conditions. Within the past 4 months, through the exercise of the authority of leading oil-producing States, in cooperation with the producers, there was a shut-down of a sufficient number of wells to prevent a serious overproduction. While I do not claim that there will always be such unanimity on the part of State authorities, I believe that the best interests of the industry as well as the consuming public will always find expression through a majority opinion that will make such concert of action effective.

As a matter of fact, there is very little waste in the petroleum industry today. We all deplore the great waste of our natural resources that took place in years gone by, but this waste was not confined to the petroleum industry—our soil and forests paid the penalty of man's exploitation.

We deplore the burning flares which are seen against our oil horizon. In many instances the operators utilize the gas to provide fuel for their own operations. In other cases the flow of gas is so small that it could not be produced in commercial quantities. If we take the price at the well as our base, before the cost of transportation and other expenses of delivery are figured in it, we find that the waste is by no means so terrible as pictured.

Be that as it may, we would be glad to see an improvement in this direction and I can see no reason why this should not be a legitimate field for Government research, in cooperation with other agencies in this field. When we recall that at one time there was no use for cottonseed, which is now such a valuable byproduct of the cotton industry, we can visualize something of the possibilities of the natural gas now going to waste.

But we all learn by experience, ofter bitter. Here in Louisiana we have been studying the problems of conservation a good many years. Louisiana was a pioneer in the conservation of its natural resources, in the protection of its fish and game, in the establishment of wildlife sanctuaries, in the reforestation of its cut-over pine lands, but the expansion of the oil industry in this State is a comparatively recent development, the deep-well drilling of our coastal area taking place in the current decade and reaching its present proportions within the past two or three years.

Now, I submit that it would be difficult to duplicate the service which we have been able to render the oil industry of this State, through our familiarity with local conditions and the incentive to develop our natural resources for the benefit of our people.

I will give you an illustration of what I mean. Since 1921 our State University School of Geology, under the direction of Dr. H. V. Howe, has been studying the geology of our State. For the past 10 years this Geological Survey has had the financial support of our State Department of Conservation. The geological bulletins of the Survey have stimulated the interest of the oil industry in this State and I am sure that the representatives of the industry will testify to the whole-hearted cooperation of Dr. Howe and his assistants during these many years of exploration and drilling.

Dr. Howe's students, graduates, and postgraduates, have not only studied the geological formations in the field, but they have examined and classified over 30,000 corings, not only from the wells of Louisiana, but from those of thousands of other wells in other oil-producing States. This School of Geology has one of the most complete geological libraries in the world. Graduates of the school have been drawn into all branches of the petroleum industry, and many of these graduates are in the employ of this department.

One of the divisions of our department of conservation is a research bureau, with a personnel of competent engineers, chemists, and research workers. There is close cooperation between this bureau and the research workers of the oil industry. This is particularly effective where there is a conflict of oil interests and the development of other natural resources. Each of the oil-producing States has its own peculiar problems which could hardly be covered by any general set of rules and regulations. For example, it has been necessary for our department to conduct extensive experiments and investigations to ascertain whether or not the oyster beds of our coastal waters were being injured by geophysical surveys. In cooperation with the interested parties, our department engineers worked out a satisfactory solution of the problem.

In making up the "allowables" or proration orders for the various fields and wells it is necessary to take into consideration the much greater cost of drilling in the coastal area. As to the present policies of our Department I would like to quote from a recent issue of the Oil and Gas Journal, of Tulsa, Okla., independent publication of the industry:

"The department of conservation consistently has attempted to keep the State's production within the Bureau of Mines market-demand estimates. Fortunately, until now, existing allowables have been sufficiently high so new production could be absorbed. At the same time, by drastic reductions in allowables of a number of fields last August production was reduced so much below the Bureau of Mines estimates that, with further reductions in other fields since, there has been adequate margin to take care of new production * * *.

"Keeping pace with this development, the conservation department, under the present administration, steadily is providing more efficient and effective regulation over drilling and production. Control of production is being placed on a more scientific and engineering basis with administration being extended to take in not only allocation of allowables to the respective fields but to the different leases and the individual wells.

"Attention particularly is being directed to the producing wells whose allowables are now being restricted to production consistent with efficient engineering practice. Under the program being developed, stricter regulation of drilling permits is being observed that more orderly drilling and spacing programs might be effected. Although not attempting to interfere in existing fields, except in prevention of waste and excessive production, the department of conservation is undertaking to conduct public hearings for all new fields to determine the most adaptable practices * * *.

"In the carrying out of its new program, the conservation department has received close cooperation of the majority of operators, despite the fact that the program has called for stricter control of production and operations."

Now, I respectfully submit that in all fairness and justice, the State officials and members of the petroleum industry should be permitted to continue their efforts to develop the industry in an efficient manner, and I do not see how it would be possible to duplicate the service which we are now rendering the oil industry of this State.

True, the petroleum industry suffered from the common ailments of the great depression, along with all lines of industry in America; but the "repercussions" from its demoralization, if any, were probably of less serious impact than those of any other industry.

I am sincere in the conviction that the petroleum industry should be permitted to work out its own salvation, subject only to the regulations of the respective oil-producing States.

Mr. Cole. All witnesses will have an opportunity to revise their remarks. A copy of the transcript will be sent to all witnesses for that privilege at your home and I hope that you will return it as soon as you can conveniently do so, so that we may have this record printed. Ample opportunity will be given you to revise your testimony. If there are any extensions of your remarks, which you deem advisable by way of insertion of something other than your own statement, if you will send that on to me, I am quite sure the committee will permit it to be inserted. That refers to the Governors who have been before us this morning.

The committee will recess until 10 o'clock tomorrow morning.

(Thereupon, at 12:40 p. m. the committee took a recess until 10 a. m. the following morning, Wednesday, February 7, 1940.)

PETROLEUM INVESTIGATION

WEDNESDAY, FEBRUARY 7, 1940

House of Representatives,
Subcommittee of the Committee on
Interstate and Foreign Commerce,
Washington, D. C.

The subcommittee met, pursuant to adjournment, in the committee room, New House Office Building, at 10 a. m., Hon. William P. Cole, Jr., presiding.

Mr. Cole. The committee will please be in order. Governor Phillips.

STATEMENT OF HON. LEON C. PHILLIPS, GOVERNOR OF THE STATE OF OKLAHOMA

Governor Phillips. Mr. Chairman and gentlemen of the committee.

Mr. Cole. Governor, I have been asked to explain the absence of some of my committee this morning. The transportation conference between the Senate and the House is meeting very actively at this time. I happen to be a member of the conference myself, but I think that the other members are going to divide their time between the two meetings, and I am sure they will be here before you conclude. We will be very glad to hear you at this time.

Governor Phillips. I am grateful for the opportunity to express my views to this committee on the subject of your investigation. You are conducting these hearings to bring down to date the investigations you made several years ago and to consider the need or advisability of Federal oil-conservation laws. While conservation of petroleum is generally approved and practiced, neither the States nor the industry will favor conservation by Federal authority. For this reason H. R. 7372 has aroused and will arouse the opposition of not only the industry but of the Governors, regulatory bodies, conservation officers, and citizens of the oil-producing States. And I think that could be well extended to the citizens of nonproducing States as well.

This opposition is evidenced by the fact that Governors of many such States are appearing in person, by representatives, or by filing statements in opposition to the measure.

Mr. Cole. May I interrupt you for a moment, Governor, just to inquire as to whether you appear now solely in your capacity as Governor of the State of Oklahoma or also as chairman of the compact group?

Governor Phillips. I have prepared this statement as the Governor of Oklahoma. I have been so recently elected chairman of the

Interstate Oil Compact Commission that I think there are possibly two other gentlemen who can present that picture, if there is any fact to be established about that, possibly better than I can. However, as a member of the compacting States, I have, as a Governor of a compacting State, cooperated all during my administration in the developing of this idea of the compact.

I visited and communicated with the governors and public officials of the producing States. I went to Illinois in the capacity of Governor and discussed the matter with certain officials there. I have communicated with the Governors of every oil-producing State, calling their attention to the thing that is happening, the threat that I believe this bill constitutes, against the States, and the welfare of the citizens trying to develop the idea of cooperating among themselves.

Mr. Cole. Governor, the reason I asked the question I did is because I assured Colonel Thompson, your predecessor as chairman of the compact group, that the compact group as such would be given time to appear before the committee, and I was just wondering whether that time was being taken in your appearance today or if you wanted us to hear the other gentlemen also.

Governor Phillips. No; of course, we are going to present this in such way as meets with your idea of a proper presentation of the facts. After I have finished with this statement, if it meets with your approval—I refer in this statement of mine to a paper written by Judge Fouts, of Houston, Tex.—I think it is an important thing, because I understand some of the testimony that has already gone on, there seems to be some apparent misunderstanding of some of the men about whether or not we have entered into the field of price fixing and what this idea of conservation really is.

Mr. Cole. I understand, Governor, you mentioned that you wanted Judge Fouts to follow you.

Governor Phillips. He has already filed a written statement and I think it would probably be very important if he could, if he would be permitted to read that paper.

Mr. Cole. I am sure that would interfere with the assurances I have given quite a number of the State representatives here who want to get back. Their testimony will be given following you and the compact group will be taken later.

Governor Phillips. That is perfectly all right. I merely make that suggestion. I stated in the beginning that we would be very glad to extend our matter as you may direct.

Now, there are three gentlemen here who represent governors who could not come. Mr. Downing of the State of Colorado. Mr. White, the State of Michigan, and Mr. Hoffmaster was here yesterday, but he could not stay, because they have an important State matter to present today.

Mr. Cole. Very well.

Governor Phillips. So far as the Compact Commission is concerned, we do have Colonel Thompson, Mr. Dow, and Mr. Saddler who will present the matter for the Compact Commission .

Mr. Cole. I think that the appearance of Judge Fouts will have to wait because of the assurance I have given all of the other State representatives.

Governor PHILLIPS. Certainly.

Mr. COLE. You may proceed.

Governor PHILLIPS. We discussed this yesterday, and we want to get through with it if that is all right with the committee.

Mr. COLE. Yes. I am sorry to interrupt you, but wanted to straighten out that procedure.

Governor PHILLIPS. The regulatory bodies and conservation officers of the oil producing states are likewise appearing in opposition to the measure. They do not believe that the proposed cooperation between the Federal and State officials will work out but will result in confusion and a conflict of authority and will impair rather than foster conservation. There will also be general opposition that the bill is not only an invasion of State's rights but an attempt to regiment an industry.

Opponents of the measure do not believe that it is necessary to enact Federal legislation on the subject. The Conference of Southern Governors recently held at Nashville, Tenn., expressed the idea of the opponents of the measure in a resolution which was unanimously adopted. This resolution was:

> With reference to the problem of controlling and regulating the production of oil and gas the committee is of the opinion that the States have, through cooperative action, already taken steps to conserve and safeguard adequately their petroleum resources. We urge that the States continue their efforts to control the production of oil and gas by joint enterprise, and that all States producing oil and gas, nor or hereafter, that are not members of the interstate oil compact, join said compact.

Sponsors of the bill represent that its purpose is to aid, supplement and assist conservation by the States. Opponents of the bill see in it a deliberate attempt to take over a great industry and to take away State's rights and supersede State authority. I subscribe to this view; I believe that the broad powers granted in the bill will be used and exercised. By its provisions it appears the commissioner to be appointed under the proposed bill may, by rule and regulation to prevent waste, control the production of oil from every well in every field in the United States. Nor only may he control production, but he may regulate and control the location, drilling, equipping and completion of every well. He may require and refuse a permit to drill. He may require and refuse a permit to plug and abandon a well. He may completely control the operation, from the staking of the well to its final abandonment. It would be folly to conclude that the commissioner and succeeding commissioners would not exercise all the power that the bill grants.

From the statements of the sponsors of the bill—and I want to say again here that I do not make that with reference to the author, but the evidence already shows who the real sponsors of the bill are, and that is what I refer to in these remarks when I say the sponsors of the bill.

From the statements of the sponsors of the bill they appear to be greatly alarmed that our petroleum resources will soon be exhausted. The Secretary of the Interior thinks we are producing too much from our reserves. We may, therefore, expect that if such be the national policy, and the bill be enacted, that the commissioner would use the broad powers granted to greatly curtail our production. This, of course, would curtail exploration and development, increase our unemployment, and bankrupt our producers. If our production were curtailed sufficient to create a scarcity, unduly high prices would follow, and more than 50,000,000 consumers over all the Nation would foot the bill.

Since the bill would impose additional burdens and expense on the producers it is obvious that they will strenuously oppose the measure. No one can contend that the bill will be of great benefit to producers, either large or small. Since it is customary and usual for the expenses and burdens of an industry to be passed on to the consumer, I do not see that this bill is in the interest of the consuming public. I see no provisions in the bill, nor have any been pointed out, which will provide for the consumer a better or a cheaper product. I therefore do not believe that informed consumers will ever favor its passage.

Oil is vital to Oklahoma. We produce approximately one-eighth of the oil of the Nation. It is our chief cash crop. Annually we produce and sell more than a hundred and fifty million dollars worth of oil. This is more than 7 times the value of our cotton crop. It is 6 times the value of our wheat crop, and 10 times the value of our corn crop. The 4 major agricultural crops produced in Oklahoma, wheat, cotton, corn, and oats, in 1939 aggregated in value $71,000,000. This is less than half the value of the oil produced in the same period of time.

The petroleum industry paid the State more than $30,000,000 in taxes during the last fiscal year—$9,000,000 in gross-production taxes, $16,000,000 in gasoline taxes, and more than $4,500,000 in State income and use taxes, and this does not count the money that was paid to the National Government. This is what Oklahoma was paid. This was more than half of the total State revenue. These revenues are indispensable to the proper maintenance of State and local governments. The whole economic structure of the State is dependent upon petroleum. Oklahoma and her citizens have a vested and proprietary interest in the industry. Anything which will injuriously affect the oil industry is of the deepest concern to us.

The oil industry is interwoven into the economic structure of the Nation. No other industry, with the exception of agriculture, affects the lives of so many of our people. Twenty States now produce petroleum. Many others are, no doubt, underlaid with vast petroleum reserves which in time will be discovered if the independent operator—the wildcatter—be given a reasonable chance to explore. Petroleum constitutes 40 percent of the mineral wealth of the United States. Refining is the fourth largest manufacturing industry in the country. Refineries are located in 33 of the States, and there are 115,000 miles of pipe lines traversing 34 States. Petroleum products are available in every village and hamlet in America. Service stations do 7 percent of the Nation's retail business.

In 1938 the industry and its products paid over a billion and a quarter dollars in taxes toward the support of Federal, State, and local government. This was 10 percent of the Nation's total tax revenue. Twenty-five percent of State revenue collected by all the 48 States comes from petroleum. Approximately 40 percent of the retail price of gasoline is tax. There is a Federal tax, and every State has a tax.

The industry employs more than a million Americans at higher wages than any other industry. These employees and their families are dependent upon it for their livelihood. Millions of others are partially dependent upon it. In addition to the labor employed, the industry is one of the largest purchasers of basic commodities and materials in the Nation. It is the best customer of the iron and steel industry. It is so inter-related with other industries which provide transportation, heat, light, and power that it is in fact the lifeblood of the industries of this Nation. Surely it would be dangerous to subject it from now on to the arbitrary, dictatorial, political control of some central authority.

Conservation of oil is a State problem. and the oil-producing States, in the exercise of their police power, can and will conserve this natural resource. Oklahoma has been a pioneer in this conservation movement. We have fine, comprehensive, conservation statutes. The Supreme Court of the United States, in the *Champlin case*, held that these laws were a constitutional exercise of the police powers of the States. Our corporation commission is administering these laws fairly and equitably. There is a fine spirit of cooperation between our State and the oil industry. Conservation is truly an established fact in Oklahoma. Our corporation commission and our conservation officer are attending these hearings to appear and give you the details of our conservation laws and their administration in Oklahoma.

Most of the oil-producing States have enacted, and are enforcing, similar laws. Years of experience have shown the wisdom of conservation by the States, and it is apparent that within a few years all major oil-producing States will have enacted such laws.

In order to coordinate this police power exercised by the sovereign States, the Interstate Oil Compact Commission was established in 1935. You are familiar with its organization, functions, and accomplishments. At a recent meeting of this commission I was elected its chairman. A committee was appointed to report to you its functions and accomplishments. One of our objectives for 1940 will be to get all of the oil-producing States into this compact. Last week a conservation bill was introduced in the State of Kentucky which provides for that State to join. The Mississippi Legislature, now in session, is drafting a conservation bill which will provide for membership. We are furnishing those States with copies of the laws of other oil-producing States and inviting them to join us in cooperative action by the States. We feel sure that Louisiana and Arkansas will join and that by the end of this year we will have our four new members on our commission, and since I wrote this statement and have been in Washington, I have obtained a definite promise of five States that they will become members of the compact commission.

Mr. Cole. Would you mind naming those States?

Governor Phillips. Yes, sir. After we had our conference yesterday afternoon, Arkansas, Wyoming—the Governor of Wyoming was here—Governor Ayers of Montana had a telephone conference with Governor Johnson of Kentucky and a gentleman representing Mississippi who is present here. So, the gentleman who will later represent the State of Pennsylvania is going to make that recommendation to that State.

Mr. Kelly. Governor, you have not heard from Illinois on that, have you?

Governor Phillips. No, sir.

Mr. Cole. The gentleman (Mr. Kelly) is from Illinois.

Governor Phillips. I know. I think I have got a solution to that. We did what we could with Illinois by going up to St. Louis and asking the Acting Governor—of course I am not going to quote him here in view of the present conditions in Illinois—but I think that could be solved pretty easily if about four or five gentlemen could get together up there.

Mr. Kelly. I hope so.

Governor Phillips. However, we cannot go that far. We have done what we can to present this issue fairly to them and we have spent some considerable time, as I stated, with the secretary of the compact, trying to sort of focus the attention on that condition there, in order that their misdeeds of the present shall not be used as a threat against our whole future.

The States, with the cooperation of the oil industry, are getting the job done. The reserves of available oil in sight have constantly increased. Oil is now being produced under sound engineering practices to insure the largest recovery for the use of civilization.

Research and discovery have made available to the public many byproducts. An instance of this is the production of butane from natural gas. This is a liquified product which is coming into wide use by our rural population. It furnishes a cheap essential substitute for natural gas. This is just one of many examples of the foresight and ingenuity of those interested in the oil industry tending to conserve this natural resource.

The Nation need have no fear of a shortage of oil or gas in any emergency.

These few remarks following is by reason of that broadcast which it tried to instill into the minds of American citizens the fear of shortage, which I think is the reason why we ought to resist with everything in our power, the placing of the control of this industry in the hands of a man or a department, or a bureau, that would countenance such a thing. It is not necessary to have governmental control in order to assure an adequate supply. There does not appear to be any approaching shortage. The known discovered reserves are greater at this time than at any other time in the history of the Nation. It is obvious that by advanced methods in prospecting and drilling that other great reserves will be found and made available. I feel certain that long before our reserves are exhausted, engineering ingenuity will have discovered a cheap and satisfactory substitute for petroleum. Mr. Hugh D. Miser, of the United States Geological Survey, has submitted to this committee a report showing that the known shale deposits of the United States will yield in ecess of 92,000,000,000 barrels of oil. This would supply more than five times as much as our present known crude-oil reserves. From a report presented to this committee by A. C. Fieldner, J. D. Davis, and H. H. Storch, of the United States Bureau of Mines, it appears that gasoline and diesel fuel may be produced from our coal deposits. The cost of production of such gasoline was fixed as low as 12 cents per gallon in this report. Mr. Miser's report estimated that the coal reserves of the United

States would supply the demands now met by oil for about 2,000 years. Surely there is no immediate emergency.

Is there any good reason why some Federal official should now survey the field and propose a bill to take over this industry? Can this proposal be anything but a longing grasp for more power? We should not allow the propaganda of future scarcity, and the desire of the bureaucrats to gain control of the industry and import foreign oils, to prevent our present use of this resource which is so necessary to the present welfare of our people. There is no necessity for the Federal Government to undertake to enact legislation to prevent physical waste in the production of oil when the States are already efficiently doing this, and have demonstrated that they are able to conserve this natural resource. The States do this under their inherent police power, The Federal Government has no inherent police power to do this.

This bill asserts, as a declaration of policy, that to maintain an adequate national defense and regulate interstate commerce, it is necessary for Congress to prevent the waste of petroleum.

The premise that Federal conservation is necessary to maintain an adequate national defense is unsound. There is no emergency. Oil is plentiful. The discovered oil reserves of the United States have constantly increased. Petroleum products are furnished conveniently at constantly decreasing prices. This has been accomplished without Government subsidy and without Federal control or regulation of the industry. While petroleum products are useful in national defense, the quantities used are negligible when compared to the general and ordinary consumption by our people. From the evidence heretofore given to this committee, it does not appear that we experienced any difficulty in the World War. There was no shortage then, and our reserves were less than one-third of our present reserves.

Rear Admiral H. A. Stuart stated that the peacetime requirements of the Navy amounted to around 9,000,000 barrels of fuel oil, and that in case of war it was likely that those needs would be increased four or five times. Col. Harry K. Rutherford, Director of the Planning Branch of the office of the Assistant Secretary of War, stated that the consumption of petroleum products caused by a war would probably be in the neighborhood of 15 percent above what is normally consumed in the country. Since we now produce and consume annually a billion barrels, you will see that the increased consumption, as calculated by Colonel Rutherford, in case of war would amount to 150,000,000 barrels. The current production of oil in the United States is prorated and curtailed by the States to around 3,500,000 barrels per day. From this it will be observed that the maximum war needs would not amount to more than 6 weeks curtailed production, and it would be very easy for the States to raise the allowable production to compensate for that demand. It would simply be a question of opening up the valves. This could be done within a few hours. For the last 2 years we have exported approximately 16 percent of our domestic production. It is obvious that by cutting off our exports we could furnish the war demands of this Nation without increasing production a single barrel.

It will thus be seen that the oil industry and the States are mobilized and ready to answer the roll call. There is abundant oil, and adequate transportation facilities to meet any emergency. We should not be stampeded by war hysteria into any ill-advised legislation.

It does not appear that the Navy is urging the enactment of this bill for national defense. Admiral Stuart stated, in substance, that if the States did not have adequate laws, properly enforced, that something of the sort probably was necessary. Apparently the Navy is not satisfied to turn over the production of oil from the naval reserve to this proposed Commissioner. While section 8 of the bill provides that the act shall extend to all deposits owned by the United States, it appears from Admiral Stuart's testimony that the Navy has reached an agreement with the Department of the Interior for a revision of the bill to exclude the naval reserves from its operation. If the Navy is unwilling to trust its reserves to the Commissioner, under the terms of the bill, it does not appear that the States should be asked to surrender their public lands to his control, or that private owners should be required to do so.

The Constitution of the United States does not give Congress the power to regulate the production of oil, or any other basic commodity, in time of peace, to maintain an adequate defense. By section 8, article I. Congress is empowered to levy and collect taxes to provide for the common defense, to declare war, to provide and maintain a Navy, and to raise and support armies, but nowhere in the Constitution is there granted such power as is contemplated in this bill. Neither was it the intent and purpose of the framers of our Constitution that the Federal Government should be permitted to regulate and control production and industry in every State in the Nation under the commerce clause. Congress was simply authorized "To regulate commerce with foreign nations and among the States and with the Indian tribes." It does not appear that Congress is empowered to restrict production, restrain, impair, or destroy commerce, but only to "regulate commerce."

Continued enlargement of the powers and duties of the National Government under the interstate-commerce clause will destroy our dual form of government, and result in the centralization of all power in Washington. State sovereignty will be destroyed. If Congress is empowered to control the production of oil to provide for the common defense and to regulate commerce, it is likewise empowered to regulate the production of any other basic commodity in any State in the Union and to take from the States the right to run their own business.

The fifth amendment to the Constitution provides that no person shall be deprived of his property without due process of law, nor shall his property be taken for public use without just compensation. It is elemental that real estate and oil and gas thereunder is private property. The owner has a vested right to the use and enjoyment of the same, subject only to the police power of the State. It is evident that in the enforcement of the proposed bill the Commissioner, in the exercise of the broad powers granted, would make rules and regulations which in effect would be confiscatory and would violate this clause of our Constitution. Since the bill grants such powers, I am convinced that it is unconstitutional and we hope the committee, and we believe that the committee, will take that into consideration along with the other evidence.

There are no new conservation principles in this bill; it merely incorporates principles discovered by the oil producers themselves. By its terms, the bill is an unqualified endorsement of the methods and practices invoked by the oil-producing States in their conservation laws and recommended by the Interstate Oil Compact Commission. It omits, however, certain well-founded principles of conservation which are embodied in the State laws.

Most of the State laws are superior to the proposed Federal legislation in that they take into consideration the fact that the production of oil in excess of market demand is waste, while the proposed Federal act omits entirely a consideration of that form of waste. Not only do the States prevent the waste of oil, but they consider the reasonable market demand, as forecast by the Bureau of Mines, and generally follow these estimates. Oklahoma has been under them all of the time. Since the proposed bill in no wise considers market demand, it is obvious that when and if the Commissioner takes over the responsibility of fixing the allowable production from every well in the United States based only upon the prevention of waste, the amount of oil produced would either be less than the consumer demand or in excess of that demand. It is inconceivable that he would, by chance, fix the allowable production at a figure that would exactly equal the market demand. If he curtailed production below the current needs of the country his orders would create a scarcity. A continued scarcity would cause an undue increase in the price to the consumer. If he allowed production in excess of the needs of the country, it is conceded by all that such overproduction would, indeed, be wasteful.

Then, too, the State laws are fairer and more equitable than the proposed Federal bill because they provide for ratable taking, commonly called proration. By the State laws, property rights are respected, and every producer is allowed his ratable share of the current market for such oil as he can produce without waste. The State laws take cognizance of the correlative rights of the different operators and different fields, and the administrators are bound by equitable principles. Any breach of these rights by the regulatory bodies can be challenged by the aggrieved person, who is afforded a speedy and adequate remedy in the local courts.

In the proposed act the Commissioner is empowered to make rules and regulations to define wasteful methods and practices which have the force and effect of law, and from which there is no provision for appeal to any court. He is not obligated to consider the correlative rights or to require ratable taking.

Years of experience in the oil-producing States has demonstrated that ratable taking, and the right to a fair share of the current market is not only equitable, but is the essence of conservation. My good friend, Elwood Fouts, of Houston, Tex., has prepared and submitted to this committee a paper in which he discusses at length this principle of conservation. I consider this paper sound and logical, and commend it to you for your consideration.

If this bill should be enacted into law, there will be no end to the conflict of authority and confusion which will ensue. The States would promulgate rules and regulations and seek to enforce them. The Commissioner would likewise regulate the industry. The oil men would experience difficulty in faithfully serving two masters. It is obvious that, employing a different set of engineers and experts, the two authorities would not reach the same conclusions. While the law permits the Federal Commissioner to cooperate with the State authorities, he is not directed to do so. Proponents of the bill have already been examined by this committee to determine what authority would prevail if the State rules and Federal rules should conflict. The answer has been, as you would expect from the Government witnesses, that the Federal authority would prevail. Already the proponents of this bill admit that it will in fact supersede State authority.

The rules and regulations promulgated by the Federal Commissioner would have the force and effect of law, and any violation or failure to obey the same would be punishable by a heavy fine or imprisonment, or both, for each day's violation. By the terms of the bill the pumper, the gager, the superintendent, and the president of the company can each be indicted by the Federal court in any State in the Union and found equally guilty of the same violation. To determine whether any person has violated, or is about to violate, any provision of this act, or any rule of the Commissioner, the Commissioner is constituted a court of inquiry, and may require the accused to give evidence against himself under oath in the form of a statement in writing concerning the matter under investigation.

The Commissioner is empowered to file a written complaint against a person, before himself, and after 5 days' notice, try the accused and make findings against him and issue a desist order.

The accused has the privilege of appearing in person, or by counsel, to present evidence under regulations prescribed by the Commissioner. The rules of evidence prevailing in the courts are not controlling in such hearing. The judgment of the commissioner is conclusive in all courts, if supported by substantial evidence. The commissioner is permitted to fix the time and place of this hearing. It is obvious that it would be most convenient to the Commissioner to have such hearings in Washington, D. C. The only appeal allowed the accused from the ruling or order is to the circuit court of appeals. It is provided, however, that this court is bound by the findings of the Commissioner, if supported by substantial evidence. The Commissioner may enforce his rules and regulations by injunction or mandamus in any Federal district court, without bond. The bill, conveniently, provides that the District Court of the District of Columbia shall have jurisdiction of such suits and persons. Civil or criminal proceedings may be instituted by the Commissioner in any State in the Nation.

By the terms of the bill the Commissioner is vested not only with legislative, judicial, and executive powers, but he is granted broad discretionary powers. Repeatedly the bill uses the words, "the Commissioner is authorized and empowered," but nowhere is he "directed." Truly, the Commissioner is made a dictator.

I do not believe in vesting such unusual powers in any appointive, Federal official. Such power, if ever necessary, should be kept nearer home. Elected State officials are more responsive to the will of the people. If ever a blight of Federal control is imposed upon the oil industry, the independent operator and the stripper-well owner are doomed. Governmental red tape, long-range authority, and governmental policies which he can neither control nor influence, will destroy the little fellow. Since the small operator produces more than 70 percent of the oil wells of the Nation, it appears that some thought should be had of conserving him. He is the adventurer of the oil business. He is the wildcatter who constantly risks his fortune to discover new fields. The Oil Weekly, published at Houston, Tex., in a recent issue estimated that $600,000,000 would be expended in the exploration and the drilling of wells in 1940. This money will be spent about equally for labor and materials. We should have some thought of conserving $300,000,000 worth of jobs this year for labor, and $300,000,000 worth of market for iron, steel, tools, and timber.

I believe that such legislation as this proposed imperils democracy, as we know it. From the control of the production of oil it is but a simple step to the control of refining, transportation, and marketing. Partial control of one branch of an industry having been established as a policy leads inevitably to control of the entire industry. Since all basic commodities flow in interstate commerce, the control of the petroleum industry would naturally and certainly lead to control of other basic industries for the same reason. If Congress does this to oil, it will be the entering wedge for those who seek Federal control of all production and all industry. Federal regimentation and control of industry will mean the abandonment of our free and democratic form of government.

When we look at governmental regulation of business, can we say it will improve the oil industry, or the lot of these American citizens engaged as they now are in private employment? Can we expect the administration of our oil fields by the Government to be better than its agricultural efforts have been driven from the land to the W. P. A. rolls; and we see now that the Government experts are not all-wise.

Can we point with pride to Government regulation of the railroads? Shall we shut our eyes to the fact that they are now almost wholly dependent upon advances by the Government? Do the results of governmental regulation of the coal industry tempt us to favor Government control of oil? Is there any assurance that this Federal commissioner would make no mistakes in the regulation of the oil fields? Or that their administration by Federal agency would be more efficient than by the State agency?

This would be another step in the regimentation of our citizens and our industries. This march toward Government control of industry, labor, and our free institutions must be stopped.

It is my sober judgment that the members of this committee have a great responsibility. Your findings and conclusions in this matter may not only affect a great industry, but they may fashion and shape the destiny of the Nation. I am sure that this committee is fully cognizant of its responsibility. It has made a diligent and energetic study of this question. You are fully advised of all pertinent facts and I feel sure that your report on this measure will be acceptable to your conscience and to the Nation. I believe you will find that the declarations of policy set forth in the bill are not sustained by the evidence, that there is no need for this Federal legislation, and that Congress would not be justified in enacting into law such a hazardous experiment which would stifle free enterprise and which is so contrary to the fundamentals of our form of government.

Mr. Cole. Governor, before I ask you a few questions, if I may, I want to note for the record, the presence of Congressman Disney, Congressman Massingale, Congressman Nichols, and Congressman Boren.

Mr. Boren. And Congressman Monroney.

Mr. Cole. Yes; all of the very splendid delegation from Oklahoma, who are with us this morning.

Now, Governor, in listening to your paper this morning, it reminds me somewhat of the position this committee took in 1934. That is the situation was somewhat reversed at that time.

We went through your State; we found a rather persistent demand, not only from your Governor at that time, but from others in the State of Oklahoma, that the Federal Government take a very definite place in the regulation of our petroleum production.

I am wondering if you were familiar with what was going on at that time.

Governor Phillips. Mr. Chairman, I am to a very large extent. I remember the occasion of your visit at Governor Marland's home at Ponca City at a time before we did begin this agitation and the passage of the legislation which provided for the enactment of State legislation for the interstate oil compact with your approval in Congress, and I know that the industry at that time, the officials of the State, were still in that trembling condition of uncertainty. They had not had at that time the benefit of the cooperation with the Federal Government on this bill controlling "hot oil," the Connally Act, and that was before we had learned to get together and talk our troubles over and meet them in a sensible way under the authority that we now have and now recognize.

Mr. Cole. So that in 1934, when the Governor of Oklahoma at that time made the statement—I quote from his testimony—

> Oklahoma can prevent physical waste. It can prevent economic waste in its own fields. Oklahoma may be unfortunate if Texas fails to regulate their production and prevent waste.

That, I assume, was also about your position at the same time.

Governor Phillips. Yes. I was speaker of the house of representatives of the Oklahoma Legislature at that time.

Mr. Cole. You felt that Oklahoma could handle her own individual problems, but you were apprehensive as to what might happen to your Oklahoma producers if Texas and other great States did not conduct their operations in a way similar to Oklahoma. You still feel that way?

Governor Phillips. Yes; I think that the picture has very materially improved though from what it was at that time. I am very hopeful about the condition of cooperation between the States. I think there are more people who have the picture of what this oil means now than there ever has been in the time of my memory, of State and public affairs. I think this committee has done a great deal of good by putting this picture right out in front of everybody. Yet, I think that the remedy proposed is worse even than the hurt that exists against us now.

Mr. Cole. Governor, my memory goes back very definitely to the discussions in this very room in executive session of our committee, when the proposed Federal legislation was before us, and in lieu of such legislation being recommended to Congress an investigation was recommended. We went through your State, held hearings in Oklahoma, and every place we stopped, we gave, I think the record will disclose, all the encouragement we possibly could to the formation of a compact among the oil-producing States, in the hope that they would solve this problem themselves. You recall that, I am sure.

Governor PHILLIPS. Yes, sir.

Mr. COLE. I think every member of this committee was hopeful that would be done.

Last year the President of the United States addressed a letter to the chairman of this committee, the main committee, and to the speaker, reading in part—I quote from President Roosevelt's letter of July 22, 1939:

> As you know, despite the protest that has been made toward oil conservation under State law and regulation, the production of petroleum is attended by waste. In view of the vital part which petroleum plays in national defense, as well as its importance in commerce and industry, the prevention of waste in petroleum production should be the subject of an enactment by the Congress.

I do not know what basis in fact President Roosevelt had for that statement, but following receipt of that letter H. R. 7372, to which you have referred, was introduced by me at the request of the President. I was especially interested in finding in your statement this language, on page nine with reference to the bill in question, which you have studied, I expect, as thoroughly as any man and have spoken of it many times. I read the following:

> There are no new conservation principles in this bill; it merely incorporates principles discovered by the oil producers themselves. By its terms, the bill is an unqualified endorsement of the methods and practices invoked by the oil-producing States in their conservation laws as recommended by the interstate oil compact commission.

That is the end of your statement to which I refer.

On yesterday and a number of other occasions witnesses have been before us during the present investigation of whom I have asked the question if there is anything laid down in the provisions of this bill H. R. 7372, that is, the formula established by the bill to prevent waste in the production of petroleum, in which producers generally can find anything to disagree with, as to its soundness. It seems to be generally accepted that there is not. As I read your statement, which I have just repeated, I gather that you feel that way about it.

Governor PHILLIPS. Yes. It is not the fact that we disagree with any now-announced formula for conservation. It is just I believe, as an individual, that if that power were given to that commissioner he could close Oklahoma down and break our State and stop our schools if he wanted to do it.

We work with the Federal Government everywhere we get a chance. We have an experimental station at Bartlesville, where the Federal Government cooperates with the State in the developing of every formula possible for the conservation and protection and in the promotion of production of oil. We work hand in hand with the Bureau of Mines and we recognize the correctness of their estimates, and we try to cooperate with them; but this thing of giving to one man the right to say, "You are cut out," we are afraid of; we are afraid of it.

Mr. Cole. Then, Governor, you are not objecting to the language of the bill setting up a formula to guide the production of petroleum in this country so as to prevent waste or as to the correctness of that formula.

Governor Phillips. No; I do not think we need any bill at all. Of course, we are already doing that. We do not think any bill is necessary.

Mr. Cole. I understand that.

I have before me a paper read by Governor Ratner, Governor of Kansas, who was before us yesterday, published in the Independent Petroleum Association Monthly, in which Governor Ratner states—I quote:

> The Cole bill merely contains provisions to prevent physical waste within pools. It does not attempt to regulate production except where such waste is involved. It can, therefore, be seen that the passage of this bill by the Congress would be useless duplication of the conservation machinery already set up by the States. It would tend to accomplish nothing more than is now being accomplished by the major oil-producing States.

That is the end of the quotation of Governor Ratner's speech.

It looks as though you and Governor Ratner see eye to eye on this subject we are now discussing.

Governor Phillips. Of course, his statement does not go ahead and take into consideration the fact that one or two States have not yet done it. We think this program, this spirit of cooperation, between the States will carry on and within a very short time will get this theory over to the rest of the States. I am personally already making arrangement to so care for my business in Oklahoma that I am going out to California and take a look at that picture, after nearly everybody else has already been out there and took a shot or two at it.

Mr. Cole. I recommend it very highly. [Laughter.]

Governor Phillips. The thing that has gotten—I do not say that it can be done. I agree with some of the speakers of yesterday. We would rather, in Oklahoma, even take the hurt of one or two States which have not yet seen the light and go into this matter as a State than to submit to this other thing.

The Governor of Wyoming yesterday just put it in different language when he said everything that we do in our State is dependent upon this thing. The revenue that is necessary—and, we just cannot stand here, for our people will not be content for us to stand idle and let regulations be placed in the hands of some commissioner that would destroy the functions of our Government; and Oklahoma cannot take it, and Wyoming cannot take it—Colorado and the rest of them.

I think Governor Ratner has a different picture somewhat than we do. Our regulatory bodies are selected differently. We have a conservation officer who has been in charge of it for years and years. With all of the changes in the Governor's office he has continued to stay on. Our conservation officers are elected by the people, three of them, 6-year terms, staggered, so that we have two on continually and if the Federal Government or these agencies that are fact-finding bodies have any program that is better than the one we have got, we will be meeting them at the gate and taking it up.

Mr. Cole. Be meeting them at the gate?

Governor PHILLIPS. I say, we will meet with them and we will cooperate with them.

There have been a great many facts that have been discovered by this Bartlesville station, where we have studied the problems of our area and try to conserve and try to do the things that meet with the announced intentions of this bill. We are going to go on with that program.

Mr. COLE. Governor, what is your answer to the finding, almost uniformly, by the Federal Government that there is preventable waste in our petroleum production in this country today in almost every State?

Governor PHILLIPS. Well, I do not think that is true, so far as a majority of the States are concerned. There is such a small percentage of it, taking into consideration the vast scope of the business, that I do not think that is the real motive for the passage of this legislation.

Mr. COLE. Governor, in August 1939, you passed a shut-down order in Oklahoma; was that at your suggestion?

Governor PHILLIPS. I did not sign it. I knew all about it. The corporation commission is the one who signs those orders in our State.

Mr. COLE. Well, the order states, the Governor of the State of Oklahoma, after thorough and exhaustive investigation of conditions has requested that an order be issued closing down all oil wells in the State of Oklahoma.

Governor PHILLIPS. Yes, sir.

Mr. COLE. Now, in the finding by the commission which followed your request and thorough investigation you made, is found this language, as reasons for the shut-down in the State of Oklahoma, for 15 days, and I will read from the order:

> That oil is now being produced in the State of Oklahoma and throughout the United States in such a manner as to cause an unstable condition in the oil industry and there is imminent danger that all of the types of waste, as defined in the statutes will be committed unless an extraordinary emergency order be issued that the emergency has arisen by reason of conditions that indicate the necessity of abandoning a large number of stripper wells within the State of Oklahoma, thereby resulting in permanent loss of oil from such areas and production has reached a point where it is necessary to store large quantities of oil, thereby constituting waste as defined by our statutes.

Governor PHILLIPS. We acted to prevent waste and the waste did not occur.

Mr. COLE. Then reading further,

> that the conditions which now exist in the State require a thorough examination, survey, investigation—thorough examination, investigation, examination of all of the oil fields in the State of Oklahoma in order to effectively carry out the laws of the State of Oklahoma and it is necessary that the commission have the time and opportunity to fully examine all of the common sources of supply in said State for the purpose of determining the bottom hole pressure, oil and gas ratios, and water encroachment and other conditions that create a waste of oil within the State.

That has never been done, has it?

Governor PHILLIPS. You mean we have never made that investigation?

Mr. COLE. Yes.

Governor PHILLIPS. Yes, sir.

Mr. Cole. When was it made; is there any record of it in your State, that you know of?

Governor Phillips. The corporation commission of Oklahoma will be here and will give the details on that.

Mr. Cole. Have you seen, any record by your commission, report, or finding, by your commission as to the examination of all of the common sources of supply in Oklahoma such as the order of August, directed?

Governor Phillips. I have not examined the record; no. That is a function of the constitutional body.

Mr. Cole. It has been called to my attention, and I am wondering if you are not mistaken when you say such a record following the order of August 1939——

Governor Phillips (interposing). I said that I had not seen such a record. I say that the State of Oklahoma does prevent waste and there is not substantial waste in our State.

Mr. Cole. Governor, is it reasonable in your judgment for this committee to anticipate not only the addition of Arkansas, Wyoming, Montana, Kentucky, and Mississippi, joining your compact group, but also embodying in the State statutes waste preventive measures or laws setting up formulas similar to that embodied in the bill with which you and Governor Ratner, and most of us, are in agreement as to the soundness thereof?

Governor Phillips. I think—of course, I cannot speak for the other States—but I do not think that there is any doubt but what the States of Kentucky, Mississippi, Wyoming, Montana, and Arkansas—Governor Bailey told me yesterday that under his law he had authority to just claim himself in, and that he was going to do that.

We are waiting, just practically speaking, for conditions to sort of settle down in Louisiana, before we try to take our cut at that.

Mr. Cole. Of course, you and Governor Bailey are at considerable disagreement as to the type of bill. Governor Bailey believes in total absence of supply and demand in these statutes and relies solely on conservation.

Governor Phillips. I think that illustrates how firmly he feared for his people this idea of Government control. I know that when we get to the States our regulatory bodies will so conduct themselves that it will meet the present needs of the people at the lowest possible price. When they get out of line anybody that is affected by it can have redress in the courts.

I think that that means that Governor Bailey was just ready to take it all for the protection of the rights of his State and his people, against Government control. I do not think he meant—I am not speaking for his State or anything of that kind. I do not have any right to speak for them, but that is how I interpreted what he said yesterday. He has got a good conservation law down there. He will get in this compact and he will be with us in these meetings, and we will get these reports from the Bureau of Mines. I hope that that institution always continues to be a fact-finding body. When it does, we will look the picture over. We will be the good neighbor with the rest of the States and stay within our rights as a good neighbor, as we have been for the past years in Oklahoma.

I do not think that that policy will change when the next Governor comes along or a new corporation commission is elected by the people, because that is the ideal of the people in Oklahoma and we have been for 4 or 5 years on the subject, and we are going to put some time in in trying to get the rest to look at the picture right along the lines suggested by you, Mr. Chairman.

I know what your ideals were back there in 1934 when we first went to talking about this compact, and I am going to keep the faith that you then had in the States, by doing what I can to see if we cannot go ahead and work this thing out as a State matter.

Mr. COLE. In Oklahoma at the initial meeting for the formation of the compact, the suggestion was that the States entering the compact—I will give you the exact recommendations.

Governor PHILLIPS. You are referring to the recommendations of the meeting in Tulsa?

Mr. COLE. I am referring to the meeting in Ponca City.

Governor PHILLIPS. Yes. And, I was present at that meeting as an observer.

Mr. COLE. At the Ponca City meeting there was a resolution approved by the group. As I recall, at the meeting there was present the Governor of Texas, Governor Alred; Governor Landon, of Kansas; Governor Marland, of Oklahoma. There was quite a distinguished gathering there. One of their recommendations embodied the draft of a statute which provided in section 1 the establishment of a joint State and Federal fact-finding agency to consist of one representative from each compact State; a representative of the United States as the Congress or the President shall direct, said agency to make periodical findings subject to approval and modification of the present demands of petroleum to be produced in the United States, and so on. I am reading from that language.

Governor PHILLIPS. Well, we found out by experience that the Bureau of Mines was doing that themselves and so we sort of let them keep the field.

Mr. COLE. And the compact as presented provided for no representation from the Federal Government. It has been that way ever since.

What would you think, Governor, of reversing the order of things a little bit in view of the fact that some of the States which embraced the compact theory at one time have not seen fit to go along with it, for Congress to lay down the form the compact should take, in advance as to the type of compact Congress would ultimately approve. Personally, I have always favored the procedure followed in the petroleum compact by having the States enter into compacts, then be presented to Congress; but in the case of tobacco control, we passed a measure approving a compact before any of the State governments, except Virginia, had a chance to see it, but what happened to it afterward I do not know.

Do you think that that would help in any way to bring certain States into your group?

Governor PHILLIPS. I do not know. I, of course, have my personal opinion as to what has sort of held back some of these States from joining the compact.

Unless I knew what the provisions of the legislation were, I would not be inclined to make a definite answer on it.

I think we can keep absolute faith with you and the committee which made the investigations prior to this, and develop within the next few months or during this calendar year such interest in this compact that we will show to the Nation and to your committee the fact that it is not necessary to have this legislation.

Now, we have gotten the field prepared. The meeting that we had yesterday would not have been possible if this idea had not been developed during the last 3, 4, or 5 years, where the Governors of the States would recognize their problems and be willing to sit down together and talk them out.

Mr. COLE. Since the formation of the compact in 1934, I have been anxious to find out what they have been doing, whether they have really accomplished anything. I am frank to say that I have not discovered a whole lot that the compact group has done along the lines that Congress had hoped for when we advocated the formation of a compact and looked ahead to the accomplishment by the States in this way, and not long ago—I think it was in 1938 or 1939—when Congress passed the Natural Gas Act in the Seventy-fifth Congress and, as you will remember, turned over to the Federal Power Commission pretty broad powers in connection with natural gas, we provided in that law for investigation by the Federal Power Commission of just what this compact group had done, if anything.

I had delivered to me today the advance report by the principal engineer of the Federal Power Commission to the Commission. It has not yet been printed. This is the report. I have just turned casually through it. I have only had it in my hands a little while. I turn to the conclusions and recommendations in this very complete study, starting off with the meeting at Ponca City, and discussing the activities of this committee, the part taken by your State and other compact States, and I read from page 147 of this report, conclusions and recommendations:

> After careful review of the activities of the Interstate Oil Compact Commission, and the determination from other authentic sources of the wastage of natural gas that is taking place both within the compacting States themselves and within States not within the compact, it is my definite opinion that the proper and adequate conservation of petroleum, natural gas, and other hydrocarbons and the prevention of wastage thereof cannot be satisfactorily accomplished through State control, either individually or by means of State compacts.

I will read a little further, for your benefit. This is a document which comes to Congress eventually.

> The history of the compact here reviewed discloses nothing of a tangible nature that has been accomplished either in conservation, the prevention of waste or even in the standardization or improvement of State legislation dealing therewith. The State of Illinois, one of the original signatory States in the compact has, upon reaching the status of a major petroleum-producing State, dropped out of the compact and has not yet enacted conservation legislation. Conservation legislation in other States is either inadequate or ineffectively administered.

I will not read all of the long conclusions. But the final paragraph reads:

> It is, therefore, my recommendation that appropriate Federal legislation be enacted completely controlling production and conservation of natural gas, or other hydrocarbons in the United States.

Now, before you give us, Governor, your observations on this very important report, which has just come to me, I desire to say, it presents, I think, as you will admit, first, the very earnest desire on the part of this committee to see this problem handled through State effort if possible, and in answer to many of the criticisms that came to us in past years a study by one of the outstanding agencies of the Federal Government, the Federal Power Commission. We now find this preliminary report delivered to me over the signature of Mr. Olds, chairman of the Federal Power Commission.

I would like to know, in view of the finding I have just read, whether you still feel that we should let this problem continue as it is, in the hands of the State, some of it controlled, some not, and some States with no statutory law whatsoever on the subject.

Governor **Phillips**. Of course, I would say right at the outset, I would not want to make an answer to that or give my opinion about a report that I have just now heard read from. When you first started reading that it sounded like Mr. Swanson talking. I do not know who made that investigation. I know that they have been down in Oklahoma running down rumors, and I did not know about this report being here, and I have not had a chance to see it. I do not think even that report begins to scratch the proposition or would even be a slight indication, that we ought to surrender the rights of our States and the rights of our State to tax the natural resources within our States to support our schools and institutions.

I do not intend to say anything about the grant of power to that commission. That is another field.

In coming here I do not for a moment intend to try to get over on and usurp the power or make a suggestion to the committee. I just want you to see what it means to us. I think we have got the ability to do that thing right for our people.

Mr. **Cole**. Governor, we think a great deal of your views and I hope that you will give us the benefit of anything that occurs to you.

Governor **Phillips**. Of course, Mr. Chairman, I am going to study that report as soon as I get an opportunity to and see what I think of it. I know there are two or three places where an individual or so has said that they thought we had missed the point in our regulation of the oil industry. We think under our law we are the people who have got the right to decide whether we have missed the point or not and until we get to the place where we have no inclination to study our problem and go out and try to solve that, even the maker of some report does not have the right to say he is right and we are wrong.

I just want to tell you that we are going to keep the good faith in trying to do this under the authority of the State in the good old-fashioned way.

When you read that bill, which gives the Compact Commission its power, you will see that you did not give us the power that you have given to this Commission. There is not any power in there. I do not know whether it ought to have any power.

Mr. **Cole**. You know why, do you not, Governor?

Governor **Phillips**. I think so. We have learned how to do it and whether the Congress of the United States continues that oil compact, we fellows down in the State have learned how to get along together. We have learned how to look at the threats against our very existence. We know we cannot operate in Oklahoma if somebody wants to close us down and stop our production of oil. That is vital to us. And, we want the folks who take that power away from us to do it according to the Constitution of the United States.

We are not here because we like to travel around.

Mr. KELLY. Governor, what effect would the production that exists now in the State of Illinois—and, of course, production is increasing daily there without any form of State law or State regulatory body—what effect has that on the markets in the Mid-Continent territory?

Governor PHILLIPS. We have given down a little to take the shock of their abuse and keep on going.

Mr. KELLY. It is slightly affecting the production in your State, is it not?

Governor PHILLIPS. Yes, sir; but we would rather take that, if you please, until business comes to its senses in Illinois and they take it out of the political issues that it is in up there and go ahead with the rest of us on this program, and they will do that some of these days.

Mr. KELLY. I hope they do, very shortly.

Governor PHILLIPS. I do not have any power up there. Mr. Kelly; but I think if we could get about five men in a room up there, that could be solved I have not got the power to get them together.

Mr. KELLY. I would like to be one of the five too, Governor.

Mr. COLE. Thank you very much, Governor.

Governor PHILLIPS. Thank you.

Mr. COLE. Governor Phillips, did I understand that you had a message from some other Governors you wanted to insert in the record at this point?

Governor PHILLIPS. Mr. Chairman, there are several men here who were commissioned to come down here by their Governors. I had that list a moment ago.

Dr. R. A. Smith, who is here representing Governor Dickenson, of Michigan; Mr. Hoffmaster was in attendance for a couple of days, but he had to go home. I think Dr. Smith is here now.

Mr. COLE. Yes; and then there is a representative of the Governor of Pennsylvania here.

Governor PHILLIPS. That is right, Mr. Chairman, Mr. William S. Rial, representing Governor James, of Pennsylvania.

Mr. COLE. And Mr. Moor, representing the Governor of Mississippi.

Governor PHILLIPS. They are just in the first stages down there with the passage of a conservation bill.

Mr. COLE. Now, have you gentlemen arranged any order for your appearance as representatives of the various States, or shall we just take them in the order in which the Governors were heard?

Governor PHILLIPS. Mr. Downing is here representing the Governor of Colorado, and if possible he would like to be heard for a few moments today. He is anxious to get away.

Mr. COLE. Mr. Downing, we will hear you. Or, there is another gentleman here who I also understand is anxious to get away.

Governor PHILLIPS. Mr. Bailey, of Arkansas, representing the regulatory body.

Mr. COLE. Mr. Bailey and Mr. Downing. Which shall we hear first?

Mr. BAILEY. Do you wish me to be heard first?

Mr. COLE. Either you or Mr. Downing.

Mr. BAILEY. It is perfectly all right for Mr. Downing to go ahead. I can go on this afternoon.

Mr. COLE. We will hear Mr. Downing.

STATEMENT OF WARWICK M. DOWNING, DENVER, COLO., REPRESENTING THE GOVERNOR OF THE STATE OF COLORADO

Mr. DOWNING. Mr. Chairman and gentlemen of the committee: My name is Warwick M. Downing. I am a lawyer, and reside in Denver, Colo.

I represented my State at the Governors oil conference called by Secretary Ickes in Washington in March of 1933, at all meetings of the Oil States Advisory Committee from 1931 to 1934, and at nearly all the meetings of the Interstate Oil Compact Commission. I am chairman of the gas conservation commission, the conservancy body for my State. I am vice president for Colorado of the Independent Petroleum Association of America.

In behalf of the Oil States Advisory Committee, I presented the argument to the House Committee on the Judiciary, May 14, 1932, for the approval of the original interstate oil compact bill (H. R. 10863, see printed hearing); the Committee on the Judiciary reported said bill favorably, and said bill had the favorable recommendation of the Secretary of the Interior. I made a like appearance before a subcommittee of the Senate Committee on the Judiciary, the hearings of which were not printed. I also appeared before the Cole subcommittee at Oklahoma City, on November 19, 1934, and presented a statement opposing Federal control. This statement is printed. At the Governors' conference called by Mr. Ickes in March 1933, I procured the adoption of a resolution wherein it was said:

> We believe strongly in the policy of continuous cooperation between the Federal and State Governments in the conservation of the petroleum resources of the Nation and States, with the purpose that neither the Federal Government nor the States shall surrender or lose any of their powers, but that each shall so exercise its power as to further a common policy of conservation.

I believe this principle will best solve all our problems. This resolution had the approval of Mr. Ickes.

My interest is that the prosperity of my State as to its oil and gas resources depends on development. Development depends on price and wise governmental administration. Our production now is small, but we believe we have undiscovered immense reserves of crude oil and gas. We feel that Federal control will impede and perhaps stifle this development.

But in addition to our crude oil reserves, our State contains approximately 60,000,000,000 barrels of oil recoverable from its oil shales, and many more barrels recoverable from our coil. Our oil shales will ultimately produce three times as much oil as has been produced in this country since the beginning. Our shale and coal reserves may well prove the salvation of our Nation. Colorado, and our sister State, Wyoming, contain nearly one-half of the Nation's valuable coal reserves. These reserves must be protected from Federal control.

I wish to discuss two topics peculiarly within my experience, and leave it to others more able to present the principal arguments against Federal control. These are:

First, we now have Federal control of oil and gas upon the public domain. The record of this Federal control shows us exactly what Federal control really means and emphatically demonstrates the danger of any extension of the Federal power to the exclusion of local self government and of any step in that direction.

Second, Federal control will mean that the price for crude as an important element of conservation will be ignored.

THE RECORD OF FEDERAL CONTROL OF OIL AND GAS ON THE PUBLIC DOMAIN

"By their works shall ye know them." The record of the Federal Government in the control of the oil and gas resources on the public lands presents an almost unbelievable picture of doing the wrong thing. This record has been made without regard to the personnel of Federal officers, and without regard to political parties. It commenced when Congress in 1920, by the passage of the so-called oil and gas leasing bill, committed to the Interior Department the control of the development of the public lands for oil and gas. Though Congress, as a reward for discovery, fixed the royalty at 5 percent upon one-quarter of the acreage, the Interior Department was empowered to fix royalties on the balance of the acreage, and did so in 1920 in the following amounts:

	Percent
Up to 20 barrels average per day, per well	12½
Above 20 barrels and not more than 50 barrels	16⅔
Above 50 barrels and not more than 100 barrels	20
Above 100 barrels and not more than 200 barrels	25
Upon more than 200 barrels, per day	33⅓

During the month of April 1929 the Secretary of the Interior arbitrarily refused to issue any more prospecting permits on the public domain, and arbitrarily suspended the act of Congress. At a later time, during June of 1934, the the Interior Department, without notice, reopened the public lands for entry to all first applicants, with the result that the lucky ones who heard the news first grabbed the plums.

Finally, we have the present form of oil and gas lease, as shown at page 6, in circular No. 1386, the Regulations, approved May 7, 1936. Let this lease form speak for itself, and demonstrate conclusively what happened to the public land States under Federal control. The applicant for prospecting lease was required until December 1939, Section 2 (a), to present with his application a $1,000 bond, conditioned for the payment of rentals throughout the lease term, 10 years. This is something unheard of in the industry.

All leases upon privately owned lands are upon the condition that the lessee either drill or pay rent, or his lease automatically terminates. Essentially a lessee engages in a search which may become unpropitious at any moment, and a bond requiring him to pay rentals for the full lease term, even though his well proves dry, is shocking to the oil industry. Furthermore, it discriminates against the poor man who cannot furnish such a bond.

The rentals until discovery, section 2 (d), are 50 cents an acre for the first lease year, and 25 cents an acre thereafter. Such rental is at least ten times greater than it should be, if our public lands are to be further developed. And the rental applies even during the times wells are being drilled, a requirement startling to every oil operator.

The royalty of ⅛ in respect of wildcat leases is almost universal in the oil industry except in portions of California. No landowner has the temerity to ask for more, and no self-respecting operator would give more, nor ask less.

It is worth while to note the royalties the Interior Department now demands, section 2 (e). When the average production for the calendar month in barrels per well is not over 50 barrels, the royalty shall be 12½ percent.

Between 50 and 60 barrels, the royalty shall be 13 percent.
Between 60 and 70 barrels, the royalty shall be 14 percent.
Between 70 and 80 barrels, the royalty shall be 15 percent.
Between 80 and 90 barrels, the royalty shall be 16 percent.
Between 90 and 110 barrels, the royalty shall be 17 percent.
Between 110 and 130 barrels. the royalty shall be 18 percent.
Between 130 and 150 barrels, the royalty shall be 19 percent.
Between 150 and 200 barrels, the royalty shall be 20 percent.
Between 200 and 250 barrels, the royalty shall be 21 percent.
Between 250 and 300 barrels, the royalty shall be 22 percent.
Between 300 and 350 barrels, the royalty shall be 23 percent.
Between 350 and 400 barrels, the royalty shall be 24 percent.
Between 400 and 450 barrels, the royalty shall be 25 percent.
Between 450 and 500 barrels, the royalty shall be 26 percent.
Between 500 and 750 barrels, the royalty shall be 27 percent.
Between 750 and 1,000 barrels, the royalty shall be 28 percent.
Between 1,000 and 1,250 barrels, the royalty shall be 29 percent.
Between 1,250 and 1,500 barrels, the royalty shall be 30 percent.
Between 1,500 and 2,000 barrels, the royalty shall be 31 percent, and over 2,000 barrels, the royalty shall be 32 percent.

The lease provisions give the Secretary powers of a czar. You will not believe that in a nation of free men, any Government official would expect, much less require, such despotic power. The lessee must agree, section 2 (c) 3, to drill and produce such wells as the Secretary of the Interior may require; section 2 (f), not to sell his own products to anyone except in accordance with a contract or other arrangement first approved by the Interior Department; section 4, that the rate of prospecting and development and the quantity and rate of production shall be subject to control in the public interest by the Secretary. The lessee, section 2 (m), is required to conform not only to the present regulations, but to regulations thereafter adopted.

The lessee, section 5, cannot even surrender his lease without the consent of the Interior Department. Not only may the Secretary refuse to permit surrender and claim rental for the full term, but he is given power to forfeit, section 7, not only the lease, but "all materials, tools, machinery, appliances, structures, equipment, and wells." which thereupon become the property of the United States.

In other words, the lessee is put in a strait jacket; he must drill all wells required by the Secretary, but the Secretary may stop his drilling at any moment; he cannot produce against the wish of the Secretary; he cannot sell his own oil without getting the Secretary to consent; even after he has drilled a dry hole, he cannot surrender his lease without consent, and unless he obtains such consent, must continue to pay rentals; not only is he subject to the present impossible regulations, but the Secretary reserves the power to impose new regulations which are binding upon the lessee.

It is no wonder that this lease form has effectually prevented any development upon the public domain. Since these last regulations, 3 years ago, there has been only one well drilled on a wildcat structure on the public domain under this lease form. Yet it must be remembered that the public domain includes approximately 180,000,000 acres, or, on the whole, one-quarter of the 11 public-land States of Colorado, California, Washington, Oregon, Montana, Idaho, Nevada, Utah, Arizona, New Mexico, and Wyoming; and that ordinarily hundreds and perhaps thousands of wells should have been drilled during that period.

The Independent Petroleum Association of America, that great body of independent oilmen, at three annual meetings, protested in vain against this drastic form. At its meeting in Fort Worth on October 18, 19, and 20, 1939, it passed the following resolution:

> Oil and gas leases on the public domain are not today on a parity as to terms and conditions with similar leases throughout the industry; and the development of the oil resources of the public-land States is greatly retarded by governmental regulations needlessly drastic: Therefore, be it
>
> *Resolved by the Independent Petroleum Association of America, at its annual meeting in Fort Worth, Tex., on October 20, 1939,* That we urge that the public-land States should not be placed at a disadvantage as compared with other oil States by unreasonable governmental regulations; that the present royalties required by the Government be reduced to the customary one-eighth; that rentals should be greatly reduced and not required during the time of development; that the so-called rental bond should be eliminated entirely; that all arbitrary power reserved to the Secretary of the Interior should be stricken from the lease form; that local conditions be taken into account; and that in substance the producers' 88-form lease be adopted.

Last July I helped prepare for Senator Joseph C. O'Mahoney, a powerful friend of the little fellow in the oil business, a memorandum to the Interior Department, which he presented, the opening paragraphs of which said:

> Certain amendments are here suggested in an effort to make such leases on a parity as to terms and conditions with similar leases issued by private owners in the oil industry. In support of these proposed amendmnts it is urged:
>
> 1. The Independent Petroleum Association, the membership of which embraces practically all of the independent producers in the country, has endorsed in principle the policy above stated.
>
> 2. The people of the public-lands States are unanimous in their desire for changes of the kind herein outlined. They feel they have the same right to have the resources of their States developed as do the people of other States. Such development depends entirely upon the form of lease, so that it will be sufficiently attractive to bring about such development.
>
> 3. It has never been the policy of the United States to discriminate against the public-land States nor against any portion of our people. The United States has spent large sums for roads in national forests, for national parks, and for reclamation, in order to compensate for public-land ownership. A form of lease that prevents development results in unjust discrimination.
>
> 4. It is always sound policy to encourage and protect the little fellow or pioneer in industry, generally referred to in the oil industry as the "wildcatter." At least 9 out of 10 of the oil fields have been discovered by his efforts.
>
> 5. The use of the producers' 88 form of lease is universal in the oil industry. It protects both lessor and lessee. There is no occasion for a lease form with provisions which are unusual, drastic, and unnecessary in the public interest.
>
> 6. The material result of the present lease form is that there have been drilled very few, if any, wildcat wells thereunder whereas there should be drilled many wildcat wells, even hundreds of wildcat wells each year, on the public domain.
>
> 7. Experience has shown that the present lease form not only has retarded, but has prevented development.

As the result of the 3-year fight to procure amendment of the lease regulations, and after Secretary Ickes no doubt had fully considered all our objections, just one change has been made. The lease form has just been amended by the provision that the lessee is not required to put up a rental bond, provided he pays his rental money 90 days in advance. The personal liability of the lessee for rental remains.

I have tried to present fairly a small part of the record, only a part that might be quickly presented, and a part that oil men can readily understand. However, this record is sufficient to show that Federal control as applied to oil and gas on the public domain is a control that does not promote progress, but impedes and withers human effort. You wonder why this is so. It necessarily happens that many Washington officials come largely from parts of our Nation where oil and gas problems are not understood. Administrative offices at Washington are too far removed from the scene of their activities. It too often happens that, when the ordinary citizen becomes invested with the attributes of the sovereign power of the United States, his nature changes; though with the very best intentions, he does everything he can to make it as tough as possible on the other fellow. Or he wants to try out theories and experiments. Or he thinks he knows so much that he will not heed advice. There must be something in the atmosphere at Washington that frequently changes the natures of men. On the other hand, I wish to pay especial tribute to the technical men and the regular staff officials of the Interior Department; I do not wish in the slightest degree to impugn the ability or integrity of any of the Department officials. There is something wrong about the system of too much Federal control—it just doesn't work, when progress and development are required.

Federal control has meant the destruction of the oil and gas industry on the public domain, insofar as future development is concerned. No self-respecting operator would accept such a lease. No sensible operator could pay such royalties and hope for success. No one in business will voluntarily become a slave of a public official when he can do business elsewhere as a free man. We do not want our great industry administered by officials who so easily try out theories which will so often kill the goose that lays the golden egg.

We have tried for nearly 20 years to induce the Government to make its royalties sensible and its lease form reasonable; but without success.

Can you imagine that the Railroad Commission of Texas would ever impose such a lease form upon the people of that State? Can you imagine the conservancy body of any State that would undertake a like policy of regimentation? Can you imagine any public official in any oil State who would demand such unconscionable royalties, indeed, royalties that are foolish, because they produce no revenue?

After all, the problem is principally one of administration. The proposed Federal bill does not introduce any new law to make conservation more effectual; its definition of conservation contains nothing new; in fact, such definition is distinctly less than embodied in the statutes of the States; in brief, it creates a Federal Administrator, not to cooperate with State authorities but to supplant them, not to apply only to States with no conservancy laws but to all the

States, and with power to declare what he considers to be waste, and with unheard of power to prevent what he says is waste. Do we want any official to have such despotic powers over any industry? Does administration, as we understand it in America. require the power of the dictator, or is it not better to continue our State conservancy bodies, who act after a proper notice, who give a patient, earnest hearing, and whose decisions, if erroneous, are corrected by local courts? And, after all, should not administration be controlled locally, by public officials who try to please and serve their fellows, and promote the prosperity of their communities?

It would be presumptuous for me to dispute any statement by Mr. Ickes as to his purpose in respect to this bill. But I can quote his testimony. At page 527, he says that in case of conflict between the State authority and the Federal authority, "it is the intent of this bill that the Federal authority should prevail." It is, of course, perfectly obvious that we can never have a Federal governmental agency and a State governmental agency regulating the same thing; one will supplant the other; the agency supplanted will be the State agency.

We have been taught from our boyhood days that the greatest work of man is the Constitution of the United States. One of the greatest of the principles ordained in that document, which, perhaps, as much as any other. has contributed to our outstanding national prosperity and success, is the right of local self-government. Of course the Nation has an interest in conservation, but the States have a greater interest. Unless and until the States fail or refuse to proceed along the right lines, we should keep uppermost in mind the dangers of Federal control, as proven by the record here cited, rather than take the chance of any slight benefit by reason of any hope that dictatorial power in Washington might do a little better. We should also remember that in matters of this kind, the danger in Federal control is far greater than any possible benefit.

We must also remember that the powers of the Interior Department as set up in the proposed bill, are just about as broad and sweeping as can be devised, far more so than the present acts of Congress concerning the public lands. I wonder to what extent the Interior Department would go, how far in the wrong direction, if it possessed the broad and sweeping powers given by this proposal?

THE PRICE QUESTION

Nothing more forcibly illustrates the lack of understanding at Washington that the assertion so often made, that the price of crude is not an element of conservation, and that price must always be "taboo" among conservancy officials.

Let me demonstrate the absurdity of any such "taboo." Suppose the Interior Department in case this bill become law, should determine that to obtain the so-called efficient rate of production, such production for the whole country should not exceed 2,000,000 barrels a day. Does anyone suppose for a moment that in such a case Interior Department officials would close their eyes to the soaring gasoline prices that would follow? Would not these officials make the price factor dominant? Or suppose such Interior Department officials should fix the optimum in production at 5,000,000 barrels a day, is it conceivable that they would allow such production and thereby completely destroy the price structure?

Petroleum is perhaps the only commodity where price is essential in connection with governmental regulation. A price that results in waste of petroleum is necessarily destructive to national welfare; and a price made too high by reason of excessive curtailment is likewise opposed to the public interest.

It is not the function of Government to fix a high price to please the producer, nor to fix a low price to please the consumer. Any governmental fixing of price for either objective would be highly obnoxious. In fact, Government should not fix any price. Nevertheless, a fair price is an essential to conservation.

It would be short-sighted, demagogical policy to cheapen the price of gasoline at the expense of our reserves. Furthermore, in our large-oil-producing States, a large share of their revenues depends upon a fair price for crude oil, their revenues might be affected many millions of dollars a year by a price unduly cheap.

If it happens, even temporarily, that production exceeds demand by as little as 5 or 10 percent, down goes the price of crude. When we were fortunate enough to have discovered the great Illinois oil fields, we would have witnessed a complete demoralization of the whole oil industry, and physical waste of petroleum reserves, perhaps far greater in barrels than the gross reserves added to the prosperity of our Nation by the Illinois discoveries, had it not just happened that State regulation authorities drastically curtailed production in some of the other States.

Let us constantly keep in mind that the refiner received approximately 5 cents a gallon for his gasoline, and about half that price per gallon for his other principal products, and that out of these amounts must be paid (1) the cost of the search for new oil fields which totals hundreds of millions of dollars; (2) the cost of development, amounting to an even greater sum; (3) the cost of production of crude petroleum; (4) the cost of transportation from the oil fields to the refiner; (5) the cost of refining; and (6) a reasonable profit on each of said operations.

On the other hand, the cost of transportation from the refinery to the markets is figured at about 3½ cents a gallon for gasoline, whether actually spent or not; the marketing cost is approximately 5½ cents a gallon; and the tax, Federal and State, is generally 5 cents. Therefore, the consumer, when he pays 19 cents for a gallon of gas, little realizes that only 5 cents of that price goes to the exploitation, development, production, and refining cost of what he buys; that is, 5 cents pays the cost of his gasoline, delivered at the refinery. Yet when it is said that the retail price of gasoline is too high, the cut invariably comes from the price of crude, and little or nothing is taken from the other items of the retail price, totaling 14 cents. If we subject the producer to Washington control instead of local control, what protection would the producer have? Is it any wonder that the producer thinks of price as the all-important consideration?

However, as respects conservation, a fair price as distinguished from a price too high or too low is essential for the following four principal reasons:

1. A cheap price means actual, important, physical waste.

2. A cheap price brings petroleum unduly into competition with coal, whereby the commodity of greater importance is utilized, whereas coal would answer the same purpose.

3. A fair price is necessary to conserve our present oil reserves, especially the stripper wells.

4. A fair price is necessary to maintain development costs, which are an essential prerequisite to the continuance of our petroleum reserves and to true conservation.

As respects the first reason, it is, of course, perfectly obvious that the cheaper a commodity is the more readily is it wasted. Particularly is this true because cheap crude means skimming or partial refining. A higher price necessitates a greater utilization of petroleum by cracking. This point, I think, needs no further discussion.

In respect to the second reason, our present known reserves of petroleum at best amount to a 14-year supply based on the present rate of consumption. On the other hand, we have coal reserves amounting to approximately 3,000,000,000 tons, which constitute a reserve sufficient for 2,000 years. See Mr. Miser at page 81 and Mr. Watkins at page 466 of the hearings. In addition, the coal industry supports perhaps 2,000,000 persons. While in many respects petroleum is more convenient in use than coal, yet true conservation requires a differential in price between the two commodities such as to encourage the use of coal and discourage the use of petroleum products where either accomplishes the same economic purpose. A slight increase in the price of petroleum products would rejuvenate the coal industry.

In respect to the third reason, that a fair price is necessary to conserve our present reserves, I remind you that true conservation absolutely requires that the pumping wells, and in particular the marginal or stripper wells, be preserved. Of what value is new production, if it lowers the price so that marginal wells producing in gross the same or greater amount, are necessarily abandoned or lost? There is a marked difference between petroleum and any other product in this respect; if you cease to grow wheat, the fertility of the soil is not impaired, but in fact enrichened; if you quit the cutting of timber, the trees in the meantime grow larger: whereas if you shut down a pumping well, the processes of nature, hundreds and thousands of feet below the surface, are such that the wells are invariably damaged and often destroyed. This is particularly true because production from such wells depends on keeping the underground channels open; if production ceases the channels often become clogged and water often intrudes and the result is a physical loss. This loss may amount to very little in the particular well, but aggregates an enormous sum for all the wells. Furthermore, when a small well is once shut down, there is often little or any incentive to resume operations. I realize that this is a matter not subject to precise demonstration. But everyone must admit that it is necessary to keep marginal wells in production, and that this cannot be done if the price for crude is for any length of time materially lower than the cost of operation.

At present prices for crude, which are materially lower than the cost of producing from a very large part of the wells of settled production, we are losing an alarming number of marginal wells. For emphatic corroboration, see the statement of Glenn E. McLaughlin of the National Resources Committee at page 506.

As respects the fourth reason, this is of outstanding importance. During the last 10 years, we have drilled 260,000 wells, of which 95,000 wells were dry holes, at a cost of approximately $5,616,000,000, in order to maintain our present petroleum supply. We have today, according to the American Petroleum Institute, 17,000,000,000 barrels of oil in reserve. This reserve did not just happen; it was developed as a result of the skill, energy, and daring of the petroleum industry, and at a staggering cost. Large as it is, and if it could be drawn on as needed, and if there was no increase in demand, this supply would last theoretically about 14 years. But if demand increases as it has in the past, it would be sufficient only for about 10 years. Practically, however, as pointed out by Mr. Miser, at page 91, present reserves could not produce present demand at the rate of a billion and a quarter barrels per year, except for the first few years. Therefore, new production in increasing amounts must be discovered year by year.

Necessary future development depends entirely upon a fair price. I am afraid such development will depend upon a fair price much higher than at present. Unless one may drill new wells with a fair hope of profit, there will be no new development. A short summary of the tremendous cost of this new development, the amount of money that must be provided by the industry, in order to assure the Nation's economic safety, will be helpful. I refer to the report presented to the Interstate Oil Compact Commission by Governor Marland, which report was prepared by the eminent geologist, Alex W. McCoy, under date of September 6, 1938. Mr. McCoy's figures were conservative throughout. He estimated the total demand for crude oil in the United States for the next twenty years at approximately 34,000,000,000 barrels. In order to supply this demand, and to maintain reserves, it will be necessary to discover 28,000,000,000 barrels of new oil, which is nearly 6,000,000,000 barrels in excess of the total amount produced to this date. He estimated that this will require the drilling of probably 400,000 oil wells, and 500,000 dry holes, all to depths much greater than in the past. The average cost per well will approximate $45,000. The total cost of development, therefore, will be $40,000,000,000, almost as much as our national debt.

During the next 20 years, the average finding rate must be 1,400,000,000 barrels of oil per year. This, by the way, has been the average rate between 1924 and 1938. It is also interesting to note that Harold L. Miller, senior petroleum engineer of the Bureau of Mines, at page 325 of the testimony, states that if our oil reserves are to be maintained, slightly more than 1¼ billion barrels of new reserves must be discovered annually. Mr. Watkins, at page 467, says:

> To maintain our present position we shall have to discover more than a billion barrels per year—and consumption is rapidly growing.

Mr. McCoy's estimate of 28,000,000,000 barrels of oil necessary for the next 20 years, was based on an average annual oil consumption of 1,700,000,000 barrels. He estimated production from the present reserves during the 20-year period as 11,700,000,000 barrels. If 28,000,000,000 barrels of new oil is discovered during that period, 80 percent thereof, or 22,300,000,000 barrels, can be produced during that 20-year period, thus making the total of 34,000,000,000 barrels corresponding with his estimate of demand. He further concluded that at the end of the 20-year period, total reserves will amount to 7,500,000,000 barrels, a relatively small reserve.

Referring again to Mr. Miller's testimony at pages 290 and 327, he figures the cost for dry holes and the cost of finding new oil has been $143,000,000 per annum during the last 5 years, a cost for these items equivalent to 13 cents per barrel of present production. Applying the same per annum rate for the next 20 years, we have a total of nearly $3,000,000,000, a staggering sum, even though much less than Mr. McCoy's figures. However, Mr. McCoy's estimate is based on the necessary assumption that due to deeper and more expensive drilling, and due to the increasing difficulty of locating new oil reserves, the number of wells will be greater and the per well cost will be much higher during the next 20 years than during the last 20.

The committee on balance of supply with demand of the Independent Petroleum Association of America states emphatically in its report of January 22, 1940, that the producing branch of the industry as a whole has been operating at a loss for some time. It is significant that the testimony of the Interior Department has very little to say about this important topic. Mr. Miller, at page 376, stated that an extensive study showed that in 1934 the average cost of producing oil in the United States was 80.3 cents per barrel, and during the same period the average selling price was 98.4 cents per barrel, thus showing an apparent operating profit of 18.1 cents per barrel. However, he adds that since then the costs have greatly increased, the average in June of 1938 being approximately 87 cents per barrel. No doubt the costs have increased since then. He doesn't mention that at present the average price for crude is 98 cents a barrel, or a little less than in 1934. Nor is it mentioned that the Tariff Commission about 1930, after a very exhaustive study, determined the cost of production to be $1.10 per barrel.

At best, the margin, if there be any margin, is pretty slim, and certainly if the 13 cents per barrel cost of dry holes and finding new oil is added to production cost, present prices do not show any margin of profit sufficient to justify the necessary future development. Furthermore, any average cost figure is misleading because it takes into account both flush production, the cost of which may not be over 20 cents per barrel, and the cost of wells of settled production and stripper wells, the cost of which is the controlling factor. For illustration, Mr. Miller, at page 379, says that the producing wells of West Virginia, with only about 500 of nearly 19,000 producing more than 1 barrel of oil daily, show an average net cost per barrel in 1937 estimated at $2.37 per barrel.

Unquestionably, the price of crude is now at an irreducible minimum, if the Nation expects the industry to discover the necessary new reserves. Necessarily, if price decreases, there will be no search for new oil fields. Indeed, a decided price increase is necessary throughout the next 20 years if the necessary new oil is to be found. Th Nation dares not undertake any experiments that would eliminate this price factor. An adequate price is the most essential element of conservation. It is interesting to note as a matter of history, that during 1931–33 when crude was selling at 80 cents a barrel or less, new discoveries were negligible, whereas the great additions to our reserves came when the price for crude was around $1.20 per barrel or better.

No one doubts the ability of the industry to supply the great demands of the future, provided only the profit element remains. If the price for crude is fair and reasonable, and governmental control is exercised wisely, the Nation need not have the slightest fear in respect to its oil supply. However, there must be cooperation all along the line, particularly cooperation between Government and the industry. You don't help conservation by pin pricking the larger oil companies. In fact, they are the most effective conservationists of all. On the part of industry, there must be development expense amounting to $10,000,000,000 more or less. There must be constant improvement in technique in discovering and producing oil, and in refining. There must be less waste in utilizing the products. Great as has been the accomplishment of the oil industry during the last 20 years, its accomplishments during the future will be far greater.

Now, how easy it would be for some theorist at Washington to upset the apple-cart. Suppose this theorist, for illustration, caused a reduction of only 10 cents a barrel in the price of crude. How could the development cost of the next 20 years be financed? Federal control might eliminate the price factor, and if so, cause the breakdown of all work to maintain our reserves and thereby bring incalculable harm to our country. We cannot afford to take the chance of Federal control; it is to orisky.

Consider a few familiar examples: The Interstate Commerce Commission law was a splendid conception, but it has operated to hamstring the railroads; the Securities and Exchange Commission was intended for a splendid purpose, yet administration at Washington has largely held back the flow of capital into business. Too much of what Washington undertakes, ends up in administrative procedure that makes it impossible for the average citizen to thrive commercially.

The proposed Federal control bill might possibly serve a useful purpose in unimportant ways. But it might be the beginning of Federal control of everything and the regimentation of everything and everybody everywhere. Those in the oil industry have a right to be proud of its achievements; the major oil companies have done a wonderful work, the interstate oil compact commission, with its humble place in respect to governmental power, has functioned admirably; the police powers of the States to conserve their resources have been approved and determined by repeated and conclusive court decisions; a Federal control bill might be the beginning of controversies and uncertainty that might take years to solve; it might introduce confusion and a mass of reports and petty exactions, requirements, and persecutions; it is better to let well enough alone than to embark in new schemes which upset governmental policies that have contributed so much to our success as a nation.

There is no pretense of any waste of oil and gas sufficient to justify this extraordinary proposal. On the contrary, we all know what a wonderful job has been done by the States. We know that more than 2,000,000,000 barrels of oil have been added to the national reserves by the wonderful manner in which the east Texas field has been managed by the railroad commission of that State. Similar results have been obtained in Oklahoma, Kansas, California, and other States. I have read carefully the testimony of the witnesses in support of this bill. Some talk rather generally about waste. Mr. Ickes, at page 541 of the hearings, says "I do not think the States have done all they might have done."

But there is nothing specific and, indeed, no evidence whatsoever to establish any considerable waste. In fact, the principal evidence to support the charge or inference appears to be the statement of the Honorable James A. Veasey, a noted attorney, before the Louisiana Bar Association, quoted by Mr. Ickes at page 523. It is also said that production from Illinois has exceeded the allowables fixed by the Bureau of Mines, that Illinois has not passed a conservation measure, that California recently defeated a conservation law, and that Nebraska may get oil and has no conservation law.

But I think it must be admitted that the operators, both major oil companies and independents, have done a wonderful job of conservation in California under existing law: that the curtailment of production in other States has more than offset the excess production in Illinois; and that, because flush wells in Illinois have produced in excess of the Bureau of Mines figures, does not prove any physical waste. Instead of evidence to show deplorable waste, the Bureau of Mines statement at page 301 shows affirmatively that whereas in the Texas Panhandle the wastage of natural gas was 30.8 percent of the gas produced during the last half of 1935, there has been a steady reduction until this waste has declined to a practical minimum; also, at page 405, it shows that the gas waste in California is now close to an irreducible minimum. The same is true in Louisiana, page 302.

In fact, the Miller and Miser statements on the whole show that the States, as well as the oil industry, are making constant progress to reduce waste and are doing a good job. We must constantly keep in mind that the operator is just as anxious as the Federal Government to prevent waste. It is money in his pocket to produce the so-called optimum and thereby realize the maximum. The major oil companies and the large operators are as resolutely opposed to all forms of waste as the Federal Government.

We all remember how the great discoveries in east Texas a few years ago were looked upon as almost a curse; without east Texas, where would the oil industry and the Nation be today? It may take Illinois a couple of years to learn, and in the meantime there may be some discomfort; but the principles of conservation as applied to oil and gas are so clear that Illinois and any new oil-producing State must quickly learn the necessity of applying conservation to their new-found production. On the other hand, if to punish or curb Illinois we must commence the experiment of Federal control, then by so doing we forever destroy the principle of local self-government, concurred in by all the founders of our Republic, and open the door to the control of all other industries, and start in the direction of socialism or communism, and take the risk of losing what we have gained by years of intelligent, successful effort by the regulatory authorities of the States.

Thank you, Mr. Chairman.

Mr. Cole. Thank you, Mr. Downing. Do you have a copy of your statement, Mr. Downing?

Mr. Downing. Not as I read it. This is a great deal longer than it was as I read it. But I gave a copy of it to the reporter and if you would like I will attempt to cut out what I skipped when I was presenting it.

Mr. **Cole**. That is all right. I would like, if you have an extra copy, to have one.

Mr. **Downing**. Yes; I would be glad to give a copy to you.

Mr. **Cole**. Some time before this record is printed, there are certain parts of your statement I want to refer to.

Governor **Phillips**. Mr. Chairman, may I ask a question which may facilitate the presentation of the case of Oklahoma?

Mr. **Cole**. Yes, Governor.

Governor **Phillips**. Is the new document which you have available for us to read in order to answer any charges which may be made there?

Mr. **Cole**. The new document, Governor—this is the only copy I know of.

Governor **Phillips**. That is not a document which has been printed by the direction of Congress, is it?

Mr. **Cole**. This is a document prepared in response to the Natural Gas Act, or provisions of the Natural Gas Act, Public Law No. 688, chapter 566, third session, Seventy-fifth Congress, under which it is the duty of the commission to prepare a report. It is filed as a preliminary report under that act.

Governor **Phillips**. Is it filed as a bit of testimony in this hearing, so that we may have access to it and answer any alleged charges that may be made in there by some individual?

Mr. **Cole**. Well, I am perfectly willing to place it at your disposal or the disposal of any of the rest of you gentlemen who may be interested. This is the only copy I know of. Eventually it will come to Congress in reported form. I do not like to put a lengthy report like that into the record.

Governor **Phillips**. Maybe it is not necessary.

Mr. **Cole**. I will do this with you, Governor, and let me suggest this: If a committee of the group here that is especially interested in it would like to go over it between now and the session this afternoon, you may come to my office and I will be very glad to have you do that.

Governor **Phillips**. My impression is, the reason I asked the question is this: I was making a statement when you asked me about it, and I said that it sounded like the work of an individual. Immediately that individual, being in this room, went to the attorney for the corporation commission of the State of Oklahoma and said that he should ask me to withdraw that remark. The very fact of the presentation of that record by a branch of the Government which is seeking to get power over our industry is one of the reasons why we think, were that power granted to them, we could expect to be told to say what we should say and do what we should do, and if that constitutes a charge against the State of Oklahoma or its officers and does not include in it the gross mismanagement of the production of oil by the Secretary of the Interior in the Osage Nation, we want to be able to answer it here in public. [Applause.]

Mr. **Cole**. Governor, let me see that we understand each other so far as the existence of the report is concerned. During the discussion of the Natural Gas Act before the committee, I think it was in 1938, because the present compact referred to gas as well as oil, as you well know, the question arose as to whether there should be any provision in the act providing for subsequent approval of subsequent compacts between States and providing for other States to enter. So that in the Natural Gas Act, with the full knowledge of everyone—and I think advocated, as I recall, by many of the States—this proviso was placed in section 11, subsection (*b*):

> It shall be the duty of the Commission—

that is, the Federal Power Commission—

> to assemble and keep current pertinent information relative to the effect and operation of any compact between two or more States heretofore approved by Congress, to make such information public and to report to the Congress from time to time the information so obtained together with such recommendations as may appear to be appropriate and necessary to promote the purpose of such compacts.

Now, that pertains to the Federal Power Commission, and I would like to straighten this out a little bit more. That was the Federal Power Commission. The Interior Department had nothing more to do with this provision being in there than you did.

Upon inquiry I found no report has been made by the Federal Power Commission. I found there was none on file and I wrote, on February 1, asking if they could give me the benefit of their studies to date and asked when Congress might expect the report from the Commission. This letter of February 6 from Mr. Leland Olds, Chairman of the Federal Power Commission, was received, transmitting the work by the principal engineer of the Commission which I happen to have in my hand.

Governor PHILLIPS. I did not want to raise any controversy, Mr. Chairman, about it.

Mr. COLE. I think that I might say further with reference to Mr. Swanson and the statement you made this morning, so far as I know, Mr. Swanson has nothing whatever to do with this work. Now, he may have, but I would be very much surprised to find that he does. If he did, then they were very capably advised.

Governor PHILLIPS. This is the thing that I want to do, to facilitate this hearing, to show the committee that we are not consenting to or agreeing that we are permitting waste and that we deny the conclusion of whatever engineer or investigator that was sent down there, and if we were to be confronted with those things, we need to know what the charges were, on the old theory that the accused are entitled to know what they are accused of doing.

Mr. COLE. I gather, Governor, from what you have in mind that you do not want these hearings closed with a report of this character in existence and these hearings having some reference to it without a full opportunity to answer.

Governor PHILLIPS. That is right.

Mr. COLE. Just when the Commission will make its finding and transmit the report and findings to the Congress, I do not know.

Insofar as this copy is concerned, it will be in my office when we recess until 2 o'clock, and if some of you gentlemen want to see it, you can do so. You can probably point out a lot of things to me, because all I have read of it is what I read to you this morning. Copies of the report may be made by those desiring to have such copies made.

We will recess until 2 o'clock.

Mr. Bailey, will that give you time to catch your train?

Mr. BAILEY. It will, Mr. Chairman.

(Thereupon, at 12:40 p. m., a recess was taken until 2 p. m. of the same day.)

AFTER RECESS

(The subcommittee reconvened, pursuant to the taking of a recess, Hon. William P. Cole, Jr., presiding.)

Mr. COLE. The committee will please come to order. Is Mr. O. C. Bailey present?

Mr. BAILEY. Yes, Mr. Chairman.

Mr. COLE. And Mr. Moore, of Mississippi?

Is Dr. Smith, of Michigan, present?

Dr. SMITH. Yes, Mr. Chairman.

Mr. COLE. Following the testimony of Mr. Bailey, we will hear the gentleman I have just named in the order stated, representing their respective Governors. I think their testimony should really follow after Governor Phillips this morning, but there are some gentlemen who want to catch a train. We will hear Mr. Bailey, of Arkansas.

STATEMENT OF O. C. BAILEY, CHAIRMAN, ARKANSAS OIL AND GAS COMMISSION

Mr. BAILEY. Mr. Chairman and gentlemen of the committee, I am glad to have the opportunity of appearing before you at this time as a representative of the Arkansas Oil and Gas Commission. The subject of conservation is one in which I am deeply interested, and is one of vital importance to my State.

If I understand correctly, the aim of your investigation is to determine if there is prevalence of physical waste in the production of oil and gas; and the purpose of the bill H. R. 7372 is to prevent that waste by Federal regulation or control.

My assumption, then, is that your committee is interested in knowing if there is any avoidable waste in the production of oil in Arkansas. Further, if Federal action is necessary or if a Federal statute could accomplish any more or be more effective in the elimination of waste than our State statute.

Frankly, in our case, I can see no benefit to be gained by added Federal legislation, since avoidable waste is being prevented, sound engineering principles are being employed, and the rights of the sovereign, landowner, and royalty owner are fully protected.

Arkansas is one of the latest States to adopt a comprehensive conservation statute. But prior to discussing our law, and the progress we are making, I want to briefly trace the history of oil and gas in Arkansas. and the events leading up to the enactment of our present law.

Natural gas was discovered in the western portion of the State some 52 years ago, and until December of last year the production of dry natural gas was confined to six counties there. Our records disclose that in excess of 92,000,000,000 cubic feet of gas have been recovered and 84.000,000,000 cubic feet remains as of January this year, in the productive areas of western Arkansas. A newly discovered pool, which is located in Columbia County of south Arkansas, is closed in and no estimates have yet been made of the probable reserves by our engineers. There is no oil or distillate associated with the deposits of western Arkansas, while the new area is of a condensate or gas-distillate nature.

To my knowledge there has been no litigation relative to the waste of gas in western Arkansas, and ratable production is observed by voluntary agreement. The Commission will promulgate rules and regulations, in accordance with our statute, for the operation of the south Arkansas discovery after a hearing scheduled for the 16th of this month. And, I will state in this connection that we have invited the members of the State utilities commission who have the regulation of gas transportation under their jurisdiction, to attend at this hearing and discuss the matter with us.

Oil was first discovered some 21 years ago, 1919, in what is now known as the Stephens field of Ouachita County, and was quickly followed by the El Dorado field in 1921 and the great Smackover field in 1922. Production at present is confined to 6 south Arkansas counties, although there is considerable exploratory activity in 10 adjacent counties.

Our records disclose that 9,584 wells were drilled in the State in the search for oil or gas over this 21-year period, and that 2,215 were dry, 698 gas wells, and 6,671 produced oil.

In excess of 501,000,000 barrels of oil have been produced from the 6,671 oil wells, 3,668 of which have been abandoned; the remaining 3,003 wells are now producing approximately 70,000 barrels daily.

At the end of each quarter it is customary for the engineers of the commission to take inventory of our remaining oil and gas reserves. These estimates are based upon two methods of computation, one for pools of unrestricted settled production, and the other for pools of restricted flush production.

From records of production compiled by the commission and its predecessor, the board of conservation, decline or history curves are constructed to represent the productive life of each old or settled pool. These curves are then extended on the chart to a point in the future that represents the probable economic limit of production for that particular pool. The indicated volume of oil consuming the projected area on the chart is then the estimated remaining recoverable oil.

For the pools of restricted production the volumetric method of computing reserves is used. Driller's and electrical logs, required to be filed with the commission, are used by the engineers to determine the approximate average thickness and productive extent of each pool. Through the courtesy of the operating companies, average porosity, connate water, and shrinkage factors are furnished and employed to estimate the volume of oil originally in place under the area in question. Knowledge of permeability conditions, water encroachment, reservoir-pressure behavior, et cetera, enable the engineers to estimate for the pool the probable percent of the original reservoir content which can reasonably be expected to be recovered. This recovery factor varies from 35 to 60 percent. From this last figure is subtracted the cumulative production, leaving, of course, the estimated remaining recoverable oil.

At the beginning of this year, our reserve estimates were, in round figures, 70,000,000 barrels for the settled pools and 230,000,000 barrels for the flush or regulated pools, a total of 300,000,000 barrels. These estimates compare with other years as follows:

	Reserves
1936	87,493,000
1937	91,036,000
1938	187,512,000
1939	300,036,000

Percent increase: Up to 243 percent.

There are 2,700 wells producing 25,000 barrels of oil daily from an estimated 20,250 acres in the old pools. This is at the rate of 9 barrels per well per day, 1 barrel per acre per day, and 13 percent of the reserves per year.

The regulated pools contain 303 wells and are producing 45,000 barrels of oil daily from 8,823 acres. This is at the rate of 148 barrels per well per day, 5 barrels per acre per day, and 7 percent of the reserves per year.

Roughly, oil was found in our old pools at depths ranging from 1,200 to 4,000 feet, at a drilling cost of from $8,000 to $40,000 a well. Our newer reserves are found at depths from 7,300 to 9,000 feet, at a drilling cost of from $50,000 to $110,000 a well.

The daily production is obtained by 200 operators of oil-producing properties, 10 of whom are majors and 190 independents. The majority of the independents are financed locally.

Six refineries operate in the State, all independents, processing around 28,800 barrels of oil each day. They maintain 15 days' working stock.

Stocks of crude petroleum on hand as of December 30, 1939, were 2,683,000 barrels, a reduction of 299,000 barrels, or 10 percent, since the same period of December 31, 1938.

There is no need for me to go into detail concerning the early productive history of oil and gas in Arkansas, as this information was presented to the committee very ably by Mr. Hugh D. Miser, chief geologist of the United States Geological Survey, at your hearing here November last. His testimony, as it concerns Arkansas, is transcribed, beginning on page 119 of the record.

It will be necessary for me, however, to go back to the middle of 1937 in order to trace the events leading up to our present conservation program. This I will do briefly.

By the middle of 1937 it had been over 10 years since any sizable oil field had been discovered in Arkansas. The Rodessa field had been discovered in Louisiana almost 2 years prior, July 1935, and was found to extend into Texas in December of that same year. After the drilling of several dry holes in Arkansas, Rodessa became a tri-State affair on June 22, 1937, with the discovery of an extension in Miller County.

At the time Rodessa was extended into Arkansas, the Conservation Department, for lack of development and funds, had become dormant. There were only two employees, a field man and a stenographer. The Conservation Statute, Act 234, of 1933, was perhaps inadequate to cope with the change in conditions.

The other States participating in the reserve, Louisiana and Texas, had definite and fixed conservation and control rules. However, the Arkansas Board of Conservation, composed of men who recognized the value of modern conservation practice, realized the danger imminent. At once they placed into effect a program consistent with that of Louisiana and Texas. They were retarded by litigation, and the Arkansas portion of the Rodessa field was dissipated through unrestrained production. But they were able to record and open to common knowledge the alarming decline in bottom-hole pressure, the wasteage of gas through inefficient production practice, and the loss in ultimate return the people could expect.

Other pools were being discovered as all this confusion was taking place in Rodessa. The landowners, royalty holders, and operators quickly foresaw the inevitable end of Rodessa and were unwilling that the same thing take place in the newly discovered fields in which they had interest.

Mr. Cole. Rodessa extends into three States?

Mr. Bailey. Yes, sir. It is a tri-State pool.

Accordingly, they petitioned the board of conservation for a public hearing, which was granted, and at that time proposed and recommended that since the conservation department was without necessary constituted authority, funds, or an engineering personnel, they would voluntarily provide funds and agree to abide by the rulings of the board until the State could be asked to assume the responsibility.

The board of conservation accepted the offer, employed engineers and equipped them, promulgated rules and regulations after findings of fact, and the arrangement worked with success, both economically and from a conservation standpoint.

With the convening of the 1939 legislature, Gov. Carl E. Bailey in his inaugural address stated that he stood ready to sponsor an oil-conservation statute which he had requested the board of conservation to prepare.

The bill was introduced as an administration measure early in the session, was passed by the legislature, and became a law with the Governor's signature February 20, 1939, as Act 105.

The act created the present commission, which is composed of seven members appointed by the Governor for staggered 6-year terms. The majority of the members are experienced in the development, production, and transportation of oil and gas, as is required by law.

The commission is given authority to employ its own personnel which consists, at the present time, of four petroleum engineers, a natural gas engineer, a part-time geologist, a gager, an accountant, an auditor, a secretary, and a stenographer. The engineers are equipped with bottom-hole pressure gages, units and trailers, gas-oil ratio portable meters, and other necessary engineering equipment. Our two offices are prepared to compile and distribute allocation schedules, check reports, and operate the "tender system."

Section 11 of Act 105 plainly outlines the duties of the commission:

> The commission shall have jurisdiction and authority of and over all persons and property necessary to administer and enforce effectively the provisions of this act and all other acts relating to the conservation of oil and gas.
>
> The commission shall have the authority and it shall be its duty to make such inquiries as it may think proper to determine whether or not waste over which it has jurisdiction exists or is imminent. In the exercise of such power the commission shall have the authority to collect data; to make investigations and inspections; to examine properties, leases, papers, books and records; to examine, check, test and gage oil and gas wells, tanks, refineries and means

of transportation; to hold hearings; and to provide for the keeping of records and the making of reports; and to take such action as may be reasonably necessary to enforce this act.

The commission shall have authority to make, after hearing and notice as hereinafter provided, such reasonable rules, regulations, and orders as may be necessary from time to time in the proper administration and enforcement of this act, including rules, regulations, or orders for the following purposes:

There are 13 items in this section 11 of the act. For me to take up each of these items separately and discuss the rules and regulations which have been promulgated in accordance therewith would take up entirely too much of your time.

The commission has issued as a small booklet its general rules and regulations of State-wide application under this provision of the act. As a part of my statement I am filing this booklet with you and marking it exhibit 1.

Mr. Cole. Is this the book, Mr. Bailey?

Mr. Bailey. Yes, sir.

Mr. Cole. You want that in the record at this point?

Mr. Bailey. I would like to introduce that in the record, if I may.

Mr. Cole. All right.

(The document referred to is as follows:)

Exhibit 1.—State of Arkansas, General Rules and Regulations Relating to Oil and Gas, Order No. 2–39, El Dorado, March 1939

(Arkansas Oil and Gas Commission: O. C. Bailey, Chairman; J. D. Reynolds, L. A. Longino, Ed Hollyfield, Robert J. Short, Basil Hoag. A. M. Crowell, Director of Production and Conservation)

Arkansas Oil and Gas Commission,
El Dorado, Ark., March 4, 1939.

Order No. 2–39
In Re: Rules and Regulations of Statewide Application.

GENERAL ORDER

Pursuant to the provisions of Act No. 105 of the 52nd General Assembly of the State of Arkansas, approved February 20, 1939, and

Whereas, after hearing and notice as provided for in Act No. 105, the Commission finds that the rules, regulations, and orders hereinafter prescribed are necessary in the proper administration and enforcement of Act No. 105, and

Therefore, it is ordered that these rules and regulations of statewide application be, and the same are hereby adopted and are in full force and effect, effective this date.

It is further ordered that any person who knowingly and wilfully violates any provision, rule, regulation, or order of the Commission made herein, shall be subject to a penalty of not to exceed One Thousand Dollars ($1,000.00) a day for each and every day of such violation, and for each and every act of violation, such penalty to be recovered in a suit in the Circuit Court of the county where the defendant resides, or in the county of the residence of any defendant if there be more than one defendant, or in the Circuit Court of the county where the violation took place. The place of suit shall be selected by the Commission, and such suit, by direction of the Commission, shall be instituted and conducted in the name of the Commission by the Attorney General or under his direction by the prosecuting attorney of the county where the suit is instituted. The payment of any penalty as provided for herein shall not have the effect of changing illegal oil into legal oil, illegal gas into legal gas, or illegal product into legal product, nor shall such payment have the effect of authorizing the sale or purchase or acquisition, or the transportation, refining, processing, or handling in any other way, of such illegal oil, illegal gas or illegal product, but to the contrary, penalty shall be imposed for each prohibited transaction relating to such illegal oil, illegal gas, or illegal product.

Any person knowingly and wilfully aiding or abetting any other person in the violation of any rule, regulation, or order made herein, shall be subject to the same penalties as are prescribed herein for the violation by such other person.

ARKANSAS OIL & GAS COMMISSION,
A. M. CROWELL,
Director of Production.

It is so ordered by the Commission:
O. C. Bailey, *Chairman*,
J. D. Reynolds,
Ed Hollyfield,
Robert J. Short,
L. A. Longino,
Basil Hoag.

El Dorado, Ark., March 4, 1939.

GENERAL

RULE A–1. The following rules and regulations have been adopted by the Oil and Gas Commission and are General Rules of state-wide application, applying to the conservation and prevention of waste of crude oil and natural gas in the State of Arkansas and protection of the vested, coequal or correlative rights of owners of crude oil and natural gas. Special rules, regulations and orders will be issued when required and shall prevail as against general rules, regulations and orders if in conflict therewith.

RULE A–2. No special rule, regulation or order, including change, renewal or extension thereof, shall, in the absence of an emergency, be made by the Commission under the provisions of Rule A–1 except after a public hearing upon at least seven days' notice given in the manner and form as may be prescribed by the Commisison. Such public hearing shall be held at such time, place and in such manner as may be prescribed by the Commission, and any person having any interest in the subject matter of the hearing shall be entitled to be heard.

RULE A–3. In the event an emergency is found to exist by the Commission which in its judgment requires the making, changing, renewal or extension of a rule, regulation, or order without first having a hearing, such emergency rule, regulation or order shall have the same validity as if a hearing with respect to the same had been held after due notice. The emergency rule, regulation or order permitted by this section shall remain in force no longer than ten days from its effective date, and, in any event, it shall expire when the rule, regulation or order made after due notice and hearing with respect to the subject matter of such emergency rule, regulation or order becomes effective.

RULE A–4. *Definitions.*—Unless the context otherwise requires, the words defined shall have the following meaning when found in these rules, to-wit:

Atmospheric pressure shall mean the pressure of air at the sea level, equivalent to about 14.7 pounds to the square inch.

Balance (Gas) shall mean an instrument used for determining the specific gravity of gases by weighing methods.

Barometric pressure shall mean the pressure or weight of air determined by the use of a barometer at a given point.

Barrel shall mean 42 gallons (U. S. A.).

Blow-out shall mean a sudden or violent escape of crude oil or natural gas, as from a drilling well, when high formation pressure is encountered.

Blow-out preventer shall mean a heavy casing head control filled with special gates or discs which may be closed around the drill pipe, or which completely closes the top of the casing if the pipe is withdrawn.

Bottom hole pressure shall mean the pressure in pounds per square inch at or near the bottom of an oil or gas well determined at the face of the producing horizon by means of a pressure recording instrument, adopted and recognized by the oil and gas industry, which can be lowered into the bore of the well. In the case of gas wells or wells having no fluid in the well bore, it shall mean the pressure as calculated by adding the pressure at the surface of the ground to the calculated weight of the column of gas from the surface to the bottom of the hole.

Casing pressure shall mean the pressure built up between the casing and tubing when the casing and tubing are packed off at the top of the well.

Casinghead gas shall mean any gas or vapor, or both gas and vapor, indigenous to an oil stratum and produced from such stratum with oil.

Christmas tree shall mean an assembly of valves and fittings at the head of the casing of a well to control the flow. Also spoken of as "well head connections."

Circulation shall mean the passing of an approved fluid down through the drill stem and up to the surface in the process of rotary drilling or in setting casing.

Combination well shall mean a well productive of both oil and gas in commercial quantites from the same common source of supply and which has sufficient natural gas pressure to cause the gas to enter a pipe line carrying more than atmospheric pressure.

Commisison shall mean Oil and Gas Commission.

Common source of supply shall mean geographic area or horizon definitely separated from any other such area or horizon and which contains, or from competent evidence appears to contain, a common accumulation of oil or gas or both. Any oil or gas field or part thereof which comprises and includes any area which is underlaid, or which from geological or other scientific data or experiments or from drilling operations or other evidence appears to be underlaid by a common pool or accumulation of oil and gas or both oil and gas.

Condensate shall mean the liquid produced by the condensation of a vapor or gas either after it leaves the reservoir or while still in the reservoir. Condensate is often called Distillate, Drips, White Oil, Etc.

Connate water shall mean the water which was deposited with the deposition of solid sediments in an oil or gas reservoir and which has not, since its deposition, existed as surface water at atmospheric pressure.

Conservation shall mean the conserving, preserving, guarding, or protecting the oil and gas resources of the state by obtaining the maximum efficiency with minimum waste in the production, transportation, processing, refining, treating, and marketing of the unrenewable oil and gas resources of the state.

Controlled production shall mean the production of oil or gas or both oil and gas under regulation.

Crude oil shall mean petroleum oil and other hydrocarbons, regardless of gravity, which are produced at the well in liquid form by ordinary production methods and which are not the result of condensation of gas before or after it leaves the reservoir.

Cubic foot of gas shall mean the volume of gas expressed in cubic feet and computed at a stated base pressure above the average barometric pressure, a standard base and flowing temperature of sixty (60) degrees Fahrenheit, correction made for pressure, and for specific gravity according to test made by the Balance method.

Day shall mean a period of twenty-four (24) consecutive hours from 7:00 a. m. one day to 7:00 a. m. the following day.

Development shall mean any work which actively looks toward bringing in production, such as erecting rigs, building tankage, drilling wells, etc.

Differential pressure shall mean the difference between the tubing pressure and the flow-line pressure; the drop flow-line pressure; the drop in pressure of the fluid in passing through the flow nipple or choke; in the case of an orifice meter, the difference of the pressures on the upstream and the downstream sides of the orifice; a pressure measured with a differential gauge or with a manometer (U-tube); any difference in pressure.

Distillate shall mean a product of distillation or the fluid condensed from the vapor driven off in the still, such as gasoline, naphtha, kerosene, and light lubrication oils, the result of distillation of crude oil.

Division order shall mean a written statement, dated, duly signed by the owners and delivered to the purchaser, certifying and guaranteeing the interests of ownership of the production and directing payments according to those interests.

Dry Gas shall mean natural gas obtained from sands that produce gas only; or natural gas which does not contain the heavier fractions which may easily condense under normal atmospheric conditions; not casinghead gas.

Edge Water shall mean water that holds the oil or gas, or both oil and gas, in higher structural position, usually encroaching on a field or pool after much of the oil or gas has been recovered.

Field shall mean the general area which is underlaid or appears to be underlaid by at least one pool; and "Field" shall include the underground reservoir or reservoirs containing crude petroleum oil or natural gas, or both. The words "field" and "pool" mean the same thing when only one underground reservoir is involved; however, "field," unlike "pool," may relate to two or more pools.

Flowing Well shall mean a well from which oil or gas flows naturally without pumping.

Gas shall mean the natural gas obtained from gas or combination wells regardless of its chemical analysis.

Gas allowable shall mean the amount of natural gas authorized to be produced by order of the Commission.

Gas assessment shall mean the assessment on each thousand cubic feet of gas produced from a gas well to pay the costs incident to the administration of the rules of the Commission.

Gas repressuring shall mean the introduction of gas or air into a common source of supply by artificial means in order to replenish, replace, or increase the gas energy causing the oil to flow out of the reservoir.

Gas-sour shall mean gas which contains hydrogen sulfide, sulfur, or other deleterious substances in sufficient quantities to render it unfit for domestic light and fuel.

Gas well shall mean (1) a well which produces natural gas only; (2) that part of a well wherein the gas-producing stratum has been successfully cased off from the oil, the gas being produced through a Braden-head and the oil through an inner string of casing or tubing; (3) any well capable of producing gas in commercial quantities and also producing oil from the same common source of supply but not in commercial quantities; or (4) any well classed as a gas well by the Commission for any reason; (5) a well that contains no liquid hydrocarbons in the reservoir.

Gas sour shall mean gas which contains hydrogen sulfide, sulfur, or other dele- to the surface.

Gas-oil ratio shall mean the number of cubic feet of gas at atmospheric pressure, as produced from an oil well or combination well, divided by the number of barrels (42 gallons) of oil, the unit of time being a day of 24 hours.

Illegal oil shall mean oil which has been produced within the State of Arkansas from any well during any time that that well has produced in excess of the amount allowed by any rule, regulation, or order of the Commission, as distinguished from oil produced within the State of Arkansas from a well not producing in excess of the amount so allowed, which is "legal oil."

Illegal gas shall mean gas which has been produced within the State of Arkansas from any well during any time that that well has produced in excess of the amount allowed by any rule, regulation, or order of the Commission, as distinguished from gas produced within the State of Arkansas from a well not producing in excess of the amount so allowed, which is "legal gas."

Illegal product shall mean any product of oil or gas, any part of which was processed or derived, in whole or in part, from illegal oil or illegal gas or from any product thereof as distinguished from "legal product," which is a product processed or derived to no extent from illegal oil or illegal gas.

Indices of productive value shall mean the factors to be considered in ascertaining the productivity of all property in a common source of supply for the purpose of fixing the allowable production. These indices can mean, at the discretion of the Commission, acreage, gas-oil ratios, static reservoir pressures, flowing pressures, fluid-level draw-downs, the well or wells, or any other pertinent factors.

Log shall mean the detailed record of the rocks passed through in drilling. See Well Log.

Meter shall mean an instrument for measuring and recording the volumes of gases and liquids.

Mud-laden fluid shall mean any approved mixture of water and clay or other material, as the term is commonly used in the industry, which will effectively seal the formation to which it is applied.

Natural gasoline shall mean gasoline manufactured from casinghead gas or from any natural gas.

Oil shall mean crude oil or petroleum.

Oil allowable shall mean the amount of oil authorized to be produced by order of the Commission.

Oil assessment shall mean the assessment on each barrel of oil produced, from any field or reservoir discovered after January 1, 1937, to pay the costs incident to the administration of the rules of the Commission.

Oil, pipe line, shall mean oil free from water and basic sediment to the degree that it is acceptable for pipe-line transportation and refinery use.

Oil well shall mean any well capable of producing oil in paying quantities; not a gas well.

Operator shall mean any person who, duly authorized, is in charge of the development of a lease or the operation of a producing well.

Overage, overproduction shall mean the oil produced in excess of the allowable as set by the Commission.

Owner shall mean the person who has the right to drill into and to produce from any field or reservoir, and to appropriate the production either for himself or for himself and another.

Period, allowable, shall mean the month or day, as designated, in which allowable may be produced.

Permeability shall mean a measure, determined by scientific means, of the ability of fluid or gas to penetrate and traverse the producing horizon in an oil or gas reservoir.

Person shall mean any natural person, corporation, association, partnership, receiver, trustee, guardian, executor, administrator, fiduciary, or representative of any kind.

Petroleum shall mean the natural untreated oil obtained from an oil well.

Pipe line shall mean any pipes above or below the ground used or to be used for the transportation of oil or gas.

Pipe-line oil; see Oil, pipe line.

Plug shall mean the abandoning of a producing or nonproductive well; the stopping of the flow of water, gas, or oil in a well.

Pool shall mean an underground reservoir containing a common accumulation of crude petroleum oil or natural gas or both. Each zone of a general structure which is completely separated from any other zone in the structure is covered by the term "Pool" as used herein.

Porosity shall mean the state or quality of being porous; the volume of pore space expressed as a percentage of the total volume of the rock mass; the percentage or pores of interspaces forming the total bulk of the material; the absorbent capacity of the material or the volume of liquid held by the pores.

Potential shall mean the actual or properly computed daily ability of a well to produce oil or gas, either or both, as determined by the rules and regulations of the Commission.

Pressure base shall mean an absolute pressure agreed upon or set as a base for converting the volume of gas metered to a correct volume.

Pressure maintenance (1) shall mean the reintroduction (in the early stages of field development) of gas or fluid produced from an oil, gas, or combination well to maintain the pressure of the reservoir. (2) The introduction of gas or fluid for the same purpose but obtained from an outside source.

Producer shall mean any person who owns, in whole or in part, a well capable of producing oil or gas or both in paying quantities.

Product means any commodity made from oil or gas, and shall include refined crude oil, crude tops, topped crude, processed crude petroleum, residue from crude petroleum, cracking stock, uncracked fuel oil, fuel oil, treated crude oil, residuum, gas oil, casinghead gasoline, natural gas gasoline, naphtha, distillate, gasoline, kerosene, benzine, wash oil, waste oil, blended gasoline, lubricating oil, blends or mixtures of oil with one or more liquid products or byproducts derived from oil or gas, and blends or mixtures of two or more liquid products or byproducts derived from oil or gas, whether hereinabove enumerated or not.

Production, illegal see Illegal Gas, Illegal Oil.

Production interests shall mean the right to a specified part of production.

Proven oil or gas land shall mean that area which has been shown by development and geological information to be such that additional wells drilled thereon are reasonably certain to be commercially productive of oil or gas or both.

Purchaser shall mean any person who directly or indirectly purchases, transports, takes, or otherwise removes production to his account from a well, lease, or common sourse of supply. Purchaser is usually considered to be the person holding the Division Order.

Ratable take see Controlled Production.

Repressure see Pressure Maintenance, Gas Lift.

Reservoir pressure see Bottom Hole Pressure.

Rock pressure shall mean the pressure on a gas well that has been closed long enough to attain a maximum; the pressure exerted by a volume of fresh water of a height equal to the depth of a well below the surface.

Rotary drilling shall mean the hydraulic process of drilling, consisting of rotating a column of drill pipe to the bottom of which is attached a rotary drilling bit.

Run shall mean oil or gas piped from one place to another.

Separator shall mean an apparatus for separating oil, gas, water, etc., with relative efficiency, as it is produced.

Shooting shall mean exploding nitroglycerine or other high explosive in a hole, to shatter the rock and increase the flow of oil.

Shortage shall mean the amount of production less than the allowable.

Shut in pressure shall mean the pressure noted at the well head when the well is completely shut in. Not to be confused with Bottom Hole Pressure.

Spudding shall mean the initial step in drilling.

Storage shall mean produced oil, gas, or both confined in tanks, reservoirs, or containers.

Taker see Purchaser.

Tender shall mean a permit or certificate of clearance for the transportation of oil, gas or products, approved and issued or registered under the authority of the commission.

Tendership shall mean the production delivered from one person to another.

Topping plant shall mean a refinery designed to remove only the gasoline and kerosene fractions from oil.

Trap pressure shall mean pressure held at the oil and gas separator.

Tubing shall mean the conduit through which oil or gas is removed from a well.

Vacuum shall mean pressure which is reduced below the pressure of the atmosphere.

Volatile shall mean easily wasting away by evaporation.

Waste in addition to its ordinary meaning, shall mean "physical waste" as that term is generally understood in the oil and gas industry. It shall include:

(1) The inefficient, excessive, or improper use or dissipation of reservoir energy; and the locating, spacing, drilling, equipping, operating, or producing of any oil or gas well or wells in a manner which results, or tends to result, in reducing the quantity of oil or gas ultimately to be recovered from any pool in this state.

(2) The inefficient storing of oil; and the locating, spacing, drilling, equipping, operating, or producing of any oil or gas well or wells in a manner causing, or tending to cause, unnecessary or excessive surface loss or destruction of oil or gas.

(3) Abuse of the correlative rights and opportunities of each owner of oil and gas in a common reservoir due to nonuniform, disproportionate, and unratable withdrawals causing undue drainage between tracts of land.

(4) Producing oil or gas in such manner as to cause unnecessary water channeling or coning.

(5) The operation of any oil well or wells with an inefficient gas-oil ratio.

(6) The drowning with water of any statrum or part thereof capable of producing oil or gas.

(7) Underground waste however caused and whether or not defined.

(8) The creation of unnecessary fire hazards.

(9) The escape into the open air, from a well producing both oil and gas, of gas in excess of the amount which is necessary in the efficient drilling or operation of the well.

(10) The use of gas for manufacture of carbon black.

(11) Permitting gas produced from a gas well to escape into the air.

Water cone shall mean the creation of irregularly intruding water by allowing a well to produce too rapidly.

Well log shall mean the written record progressively describing the strata, water, oil or gas encountered in drilling a well with such additional information as to gas volumes, pressures, rate of fill-up, water depths, caving strata, casing record, etc., as is usually recorded in the normal procedure of drilling. Also to include electrical surveying or logging.

Wildcat shall mean a drilling or producing well in an unproven territory.

DRILLING—PRODUCTION

RULE B-1. *Application to drill.*—Before any person, firm or corporation shall spud in and begin the actual drilling of any well in search of oil and/or gas in the State of Arkansas, such person, firm or corporation shall file with the Oil and Gas Commission its application in such form as the Commission shall require for a permit to drill said well. The application shall be accompanied by the sum of $50.00, which sum is fixed as the fee for granting of a permit. The permit so issued by the Commission shall be in such form as it may by its rules and regulations prescribe, and the number of said permit shall at all times be prominently displayed upon the derrick used in drilling of the well.

RULE B-2. *Bond to be furnished before "spudding in".*—Before any person shall begin drilling of any well in search of oil or gas in the State of Arkansas, said person, firm or corporation shall file with the Oil and Gas Commission a bond, payable to the State of Arkansas in the principal sum of Twenty-five Hundred ($2,500.00) Dollars, executed by said person, firm or corporation, as principal, and some surety approved by said Commission, as surety, conditioned that the said person, firm or corporation shall plug said well in compliance with all of the rules and regulations of the Commission and with the laws of the State of Arkansas, in event said well does not produce oil or gas in commercial quantities or ceases to produce oil or gas in commercial quantities within one year of the date of filing of said bond.

In lieu of furnishing the bond above required for each particular well drilled by any person, firm or corporation, said person, firm or corporation may file with the Commission a blanket bond in the sum of Ten Thousand ($10,000.00) Dollars, executed in the same manner as the bond mentioned in the preceding paragraph, conditioned that said person, firm or corporation shall plug any well drilled by it within the State of Arkansas, in compliance with all of the rules of the Commission, and the laws of the State of Arkansas.

RULE B-3. *Spacing of wells.*—A. The spacing of wells in proven oil and gas fields, or in areas that the Commission may designate, shall be governed by special rules for that particular field or area, adopted after notice and hearing.

B. "Wildcat" wells shall not be drilled closer than 660 feet to any lease or property line. "Wildcat" wells, according to the meaning used herein, shall be those which are located not less than two miles from any commercial or potentially commercial oil or gas well, and that are outside the boundaries of proven oil or gas fields or areas that may be designated by the Commission. Plugged and abandoned wells shall not be considered in applying this rule.

The Commission may, after notice and hearing, grant exceptions to this rule, provided such exceptions will create neither waste nor hazards conducive to waste. Such exceptions may be granted when surface conditions render it impracticable without unreasonable expense to drill a well at a location in conformity with this rule, or when a separately owned tract is so small or so shaped that a location in conformity with this rule is impossible.

C. No well drilled in violation of this rule without special permit obtained in the manner prescribed in said rule and no well drilled under such a special permit, which does not conform to the terms of such special permit in all respects shall be permitted to produce either oil or gas and any such well so drilled in violation of said rule or in violation of a permit granted under an exception to such rule shall be plugged.

RULE B-4. *Identification of wells.*—Hereafter every person drilling for oil or gas in the State of Arkansas, or operating, owning or controlling or in possession of any well, drilled for oil or gas, shall paint or stencil and post and keep posted in a conspicuous place near the well, the name of the person, corporation, company or association drilling, operating, owning or controlling the well, the name of the farm, the number of the well, and the number of the permit for the well, together with the section, township and range.

RULE B-5. *Well Record (log).*—During the drilling of every well, the owner, operator, contractor, driller, or other person responsible for the conduct of drilling operations, shall keep at the well a detailed and accurate record of the well, reduced to writing from day to day, which shall be accessible to the Commission and its agents at all reasonable times. A copy of the record shall be furnished to the Commission, within thirty days after the completion of any well, but shall be kept confidential, if the operator so requests in writing, for a period not to exceed ninety days after the completion of the well, provided that the report or data therein, when pertinent, may be introduced in evidence in any public hearing before the Commission or any Court, regardless of the request that the report be kept confidential.

The well record shall describe progressively the strata, water, oil or gas encountered in drilling a well with such additional information as to gas volumes, pressures, rate of fill-up, water depths, caving strata, casing record, etc., as is usually recorded in the normal procedure of drilling.

Any electrical logging or surveying of the well shall also be recorded and copy furnished the Commission, within 30 days after completion.

RULE B–6. *Oil, gas, and water to be protected.*—Before any well or any producing horizon encountered therein shall be abandoned, the owner or operator shall use such means, methods, and procedure as may be necessary to prevent water from entering any oil- or gas-bearing formations, and to protect any underground or surface water that is suitable for domestic or irrigation purposes from waste, downward drainage, harmful infiltration, and addition of deleterious substances.

RULE B–7. *Notice of intention to abandon supervision (plug).*—Before any work is commenced to abandon any well drilled for the discovery of oil or gas, including any well drilled below the fresh-water level, except such holes as are described in Rule B–10, the owner or operator thereof shall give written notice to the Commission of his intent to abandon such well, three full days prior to beginning operations on Form Number 4. Upon receipt of such notice, the Commission shall send a duly authorized representative to the location specified, to be present at the time indicated in such notice, to supervise the plugging of such well.

RULE B–8. *Plugging methods and procedure.*—The methods and procedure for plugging a well shall be as follows:

A. The bottom of the hole shall be filled to the top of each producing formation, or a bridge shall be placed at the top of each producing formation, and in either event a cement plug not less than 15 feet in length shall be placed immediately above each producing formation whenever possible.

B. A cement plug not less than 15 feet in length shall be placed at approximately 50 feet below all fresh water-bearing strata.

C. A plug shall be placed at the surface of the ground in each hole plugged in such manner as not to interfere with soil cultivation.

D. The interval between plugs shall be filled with an approved heavy mud-laden fluid.

E. An uncased rotary drilled hole shall be plugged with approved heavy mud up to the base of the surface string at which point a plug of not less than 15 feet of cement shall be placed. The hole shall also be capped similar to other abandoned holes.

F. Any other method approved by the Commission may be used.

RULE B–9. *Affidavit on plugging completion, copies.*—Within fifteen days after the plugging of any well has been accomplished, the owner or operator thereof shall file an affidavit with the Commission setting forth in detail the method used in plugging the well. Such affidavit shall be made on a form prescribed by the Commission. Copies of well plugging records and affidavits will be furnished to any person requesting same on the payment of fifty cents per copy, except in the case of core drilling, seismic, or other wells drilled for geological data.

RULE B–10. *Seismic core and other exploratory holes to be plugged; methods; affidavit.*—Before any hole is abandoned which is drilled for seismic, core, or other exploratory purposes below the fresh-water formation, it shall be the duty of the owner or driller of any such hole to plug the same in such manner as to properly protect all water bearing formations; and within one year after such plugging, an affidavit shall be filed with the Commission by such owner or driller setting forth the method used in protecting the water bearing formations in the plugging of such hole.

RULE B–11. *Wells used for fresh water.*—When the well to be plugged may safely be used as a fresh-water well and such utilization is desired by the landowner, the well need not be filled above the required sealing plug set below fresh water; provided, that written authority for such use is secured from the landowner and filed with the Commission.

RULE B–12. *Casing pullers' permits and bonds.*—Before any person shall hereafter engage in the business of pulling casing from any oil or gas well in this state for compensation, or shall hereafter engage in the business of purchasing abandoned wells, with intention of salvaging casing therefrom, such person shall apply for and obtain from the Commission, a permit to engage in such business. Before the Commission shall issue any such permit to any person to engage in the business mentioned in the foregoing paragraph, such person shall be required to file with the Commission a bond executed by such person, as principal, and some surety company satisfactory to the Commission as surety in the principal sum of $5,000.00, conditioned that such sum shall be paid the State of Arkansas for the use and benefit of the Commission, in the event the principal shall fail to plug an oil or gas well from which the principal pulls casing in the State of Arkansas without complying with the rules of the Commission.

The Commission shall issue said permits for a term not less than one year, nor more than three years, and the bond required according to the foregoing provisions shall be for a term coextensive with the term of the permit.

The Commission will revoke the permit of any person, firm, or corporation issued according to the foregoing provisions of this rule, if upon hearing held, with a reasonable notice to the holder of said permit, and at which the holder of the permit is allowed to be heard and to examine witnesses, it is ascertained by the Commission that the holder of the permit in the conduct of his business has failed to comply with any regulation established by the statutes of the state, or the rules and regulations of the Commission.

RULE B-13. *Organization reports.*—Every person acting as principal or agent for another or independently engaged in the production, storage, transportation, refining, reclaiming, treating, marketing, or processing of crude oil or natural gas shall immediately file with the Commission the name under which such business is being operated or conducted; the name and post-office address of such person, the business or businesses in which he is engaged; the plan of organization and, in case of a corporation, the law under which it is chartered; and the names and post-office addresses of any person acting as trustee together with the names of the manager, agent, or executive thereof, and the names and post-office addresses of any officers thereof. In each case where such business is conducted under an assumed name, such report shall show the names and post-office addresses of all owners in addition to the other information required.

Immediately after any change occurs as to facts stated in the report filed, a supplementary report under oath shall be immediately filed with the Commission with respect to such change.

RULE B-14. *Surface equipment.*—Meter settings of adequate size to measure the gas efficiently for the purpose of obtaining gas-oil ratios shall be installed on the gas vent line of every separator. Well-head equipment shall be installed and maintained in first-class condition so that static bottom hole pressures may be obtained at any time by duly authorized agent of the Commission. Valves shall be installed so that pressures can be readily obtained on both casing and tubing.

RULE B-15. *Casing requirements.*—In all proven fields, or areas designated by the Commission, casing requirements shall be governed by special rules for the field or area.

All oil wells shall be completed with an oil string of casing which shall be properly cemented at a sufficient depth adequately to protect the oil-bearing stratum. Gas-producing wells shall be cased in a similar manner.

All fresh-water sands shall be fully protected in such manner as will prevent same from becoming impregnated with oil, gas, or salt water.

RULE B-16. *Blow-out prevention.*—In drilling in areas where high pressures are likely to exist, all proper and necessary precautions shall be taken for keeping the well under control, including the use of blow-out preventers and high pressure fittings attached to properly anchored and cemented casing strings.

RULE B-17. *Drilling fluid.*—At the time of drilling any well, the operator shall continuously maintain in the hole, from top to bottom, good mud-laden fluid of the weight of not less than nine and one half (9½) pounds per gallon; tested in accordance with A. P. I. specifications now existing, and shall test the blow-out preventer on said well at intervals of not more than eight hours apart. Fluid specifications can be changed by special order.

RULE B-18. *Well-head fittings.*—Christmas-tree fittings or well-head connections shall have a working pressure or a test pressure in keeping with the expected depth of the well.

RULE B-19. *Daylight hours.*—All swabbing, bailing operations, or drill-stem tests shall be completed in the daylight hours before sunset. No well shall be brought into production except during daylight hours, except in the case of a wildcat well.

RULE B-20. *Cleaning wells.*—All wells shall be cleaned into a pit not less than one hundred fifty (150) feet from the derrick floor and one hundred fifty (150) feet from any fire hazard.

RULE B-21. *Boiler or light plant.*—No boiler or electric lighting generator shall be placed or remain nearer than one hundred (100) feet to any producing well or oil tank.

RULE B-22. *Rubbish or debris.*—Any rubbish or debris that might constitute a fire hazard shall be removed to a distance of at least one hundred fifty (150) feet from the vicinity of wells, tanks, and pump station. All waste shall be burned or disposed of in such manner as to avoid creating a fire hazard or polluting streams and fresh-water strata.

RULE B-23. *Tubing.*—All wells shall be equipped with, and produced through, tubing of not more than two and a half 2½) inches in diameter. Bottom of tubing on flowing wells shall not be higher than top of producing sand. If tubing is perforated, the perforations shall not extend above the top of the sand. Tubing shall be free from obstructions, and have orange peel weld or bar on bottom in order to permit free entrance of bottom hole instruments.

RULE B-24 *Chokes.*—All wells shall be equipped with adequate chokes, or beans, to properly control the flow thereof.

RULE B-25. *Separators.*—All flowing wells must be produced through an approved oil and gas separator.

RULE B-26. *Fire walls.*—All permanent oil tanks, or battery of tanks, must be surrounded by a dyke or fire wall with a capacity of one and one-half (1½) times that of the tanks or battery of tanks.

RULE. B-27. *Salt water.*—All wells producing two percent (2%) or more salt water in the controlled fields, must be reported monthly by their owner or operator to the Commission on Form No. 9.

RULE B-28. *Emulson, B. S., and waste oil.*—Wells producing oil shall be operated in such manner as will reduce as much as practicable the formation of emulsion and B. S. These substances and waste oil shall not be allowed to pollute streams or cause surface damage.

RULE B-29. *Casing tests*—The operator shall notify the Commission, before completing any well, that a test of each string of casing has been made in accordance with the provisions of the special rules governing the field or area in which the well was drilled.

RULE B-30. *Deviation tests.*—At or before the time of filing the last casing test with the Commission's agent, each operator shall file in the form of a letter a signed record of deviation tests taken at five hundred (500) foot intervals.

In order to prevent encroachments on or injury to neighboring leases or property, all wells drilled at a distance of less than one hundred fifty (150) feet from the nearest property line shall not deviate more than three (3) degrees from vertical at any point in the hole; all wells drilled at a distance of less than three hundred (300) feet and more than one hundred fifty (150) feet from the nearest property line shall not deviate more than four (4) degrees from vertical at any point in the hole; wells drilled at a distance of more than three hundred (300) feet from the nearest property line shall not deviate more than five (5) degrees from vertical at any point in the hole. The Commission shall have the right to make, or to require the operator to make a directional survey of the hole, at the request of an off-set operator and at the expense of survey of the hole at any time, and at the expense of the operator, in order said off-set operator prior to the completion of the well; and the Commission shall have the right to make or to require the operator to make a directional survey of the hole at any time, and at the expense of the operator, in order to ascertain that the well has not deviated beyond the boundaries of property on which well is located.

RULE B-31. *Report of result of shooting, perforating, or treating of well.*—Within twenty days after the shooting or chemical treatment of a well, a report shall be filed with the Commission by the owner, giving the condition of the well after shooting, perforating or treating, the size and depth of the shot or amount of chemical used, the daily production of oil, gas and water after shooting or chemical treatment, name of person rendering this service, and any other pertinent information. This report shall be signed and sworn to before a notary public.

RULE B-32. *Vacuum pumps prohibited.*—The use of vacuum pumps or other devices for the purpose of putting a vacuum on any gas or oil-bearing stratum is prohibited except in fields using vacuum pumps on January 1, 1939. The Commission may upon application permit the use of vacuum pumps in fields which are practically depleted.

RULE. B-33. *Production practice.*—Naturally flowing wells shall be produced at a continuous uniform rate as far as is practicable, in keeping with the current allowable, unless the Commission specifically permits stop-cocking to reduce the gas-oil ratio.

RULE B-34. *Notification of fire, breaks, leaks, or blow-outs.*—All drillers, owners, operators, and individuals at interest in any oil and gas wells or pipe lines, or receiving tanks, storage tanks or receiving and storage receptacles into which crude oil is produced, received, or stored, or through which oil is piped or transported, shall immediately notify the Commission by letter, giving full details, concerning all fires which occur at oil or gas wells or tanks or receptacles owned, operated or controlled by them or on their property, and all such persons shall immediately report all tanks or receptacles struck by lightning and any other fire which destroys oil or gas, and shall immediately report any breaks or leaks in or from tanks or other receptacles and pipe lines from which oil or gas is escaping or has escaped. In all such reports of fires, breaks, leaks, or escapes, or other accidents of this nature, the location of the well, tank, receptacle, or line break shall be given by section, township, range, and property, so that the exact location thereof can be readily located on the ground. Such report shall likewise specify what steps have been taken or are in progress to remedy the situation reported and shall detail the quantity (estimated, if no accurate measurement can be obtained, in which case the report shall show that the same is an estimate) of oil or gas lost, destroyed, or permitted to escape. In case any tank or receptacle is permitted to run over, the escape thus occurring shall be reported, as in the case of a leak.

The report hereby required as to oil losses shall be necessary only in case such oil loss exceeds five (5) barrels in the aggregate.

RULE B-35. *Determining and naming common sources of supply.*—Wells shall be classified as to the common sources of supply from which they produce and common sources of supply shall be determined and named by the Commission, provided, that in the event any person is dissatisfied with any such classification or determination, an application may be made to the Commission for such classification or determination deemed proper and the Commission will hear and determine the same.

In naming the common sources of supply, preference shall be given to common usage and geographic names. Separate common sources of supply within the same area shall preferably be named according to the producing formation.

RULE B-36. *Takings to be ratable.*—Every person, now or hereafter engaged in the business of purchasing and selling crude oil or natural gas in this State, shall purchase, without discrimination in favor of one producer against another, or in favor of any one source of supply as against another.

OIL—CONTROL

RULE C-1. *Fields or pools in which production will be controlled.*—All common sources of supply of crude oil discovered after January 1, 1937, if so found necessary by the Commission, will have the production of oil controlled or regulated as provided in Act 105, General Assembly, 1939.

RULE C-2. *Reports by purchasers and producers.*—*A. Purchasers.*—Each purchaser or taker of any oil from any well, lease, or pool in the State of Arkansas, shall on or before the 15th day of each month succeeding the month in which the purchasing or taking occurs, file with the Commission, on a form furnished by the Commission, a verified statement of all oil purchased or taken from any well, lease, or pool in this state during the preceding month.

B. Producers.—The producer or operator of each and every well in controlled pools shall, each month, submit to the Commission a sworn statement showing the amount of production made by each such well upon forms furnished by the Commission.

RULE C-3. *Reservoir surveys.*—By special order of the Commission periodical surveys of the reservoirs containing oil and gas in the state will be made. These surveys will be thorough and complete and shall be under the supervision of the petroleum and natural gas engineers of the Commission. The surveys shall be an investigation into the condition of the reservoirs containing oil and gas and an investigation into the practices and methods employed in obtaining oil and gas from the reservoirs. These surveys and investigations shall specifically include the volume and source of crude oil and natural gas; the reservoir pressure of the reservoir as an average; the areas of regional or differential pressure; stabilized gas-oil ratios; and the producing characteristics of the field as a whole and the individual wells within the field.

RULE C-4. *Operators to assist in reservoir surveys.*—All operators of oil wells are required to permit and assist the agents of the Oil and Gas Commission in making any and all tests including bottom hole pressure and gas-oil ratio determinations that may be required by the Oil and Gas Commission on any or all of his wells.

RULE C-5. *Oil assessment.*—Oil conservation assessment in order to pay the costs in connection with oil and gas conservation administration, not otherwise provided for, shall be made as follows:

A. There shall be assessed a charge not to exceed five mills (Act 105 General Assembly 1939) on each barrel of crude oil or petroleum marketed or used from a controlled field or pool each month. Said charge and assessment shall only apply to the first purchase or use of oil from the producer and not to subsequent transfers commonly referred to as "tenderships."

B. The first purchaser, user, or holder for a period of thirty days of the production, who is hereby defined to be the person holding the Division Order and issuing checks to pay for any working interest or royalty interest, shall before issuing checks or otherwise paying for the production, deduct the amount assessed per barrel of oil marketed used or held for a period of thirty days from the lease each month, and remit the amounts.

C. Said remittance shall be made by the fifteenth of the month following the month in which the oil was purchased in a single check if the purchaser so desires, and the only accounting necessary by the purchaser shall be to show the deductions under this order on the regular payment statements to producers and royalty owners or other parties in interest.

D. Any person purchasing oil in this state at the well, under any contract or agreement requiring payment for such production to the respective owners thereof, in respect of which production any sums assessed under this Rule are payable to the Commission, is hereby authorized, empowered, and required to deduct from any sum so payable to any such person the amount due the Commission by virtue of any such assessment and remit that sum to the Commission in the manner stated. Further, any person taking oil from any well in this state for use or resale, in respect of which production any sums assessed under the provisions of this rule are payable to the Commission, shall remit any sum so due to the Commission in accordance with these rules and regulations.

RULE C-6. *Monthly reports—costs.*—A charge of $5.00 per year or $0.50 per copy shall be made for the Commission Monthly Oil & Gas Report except to persons whose assessment equals or exceeds $5.00 per year and to government and state agencies, oil and gas associations and publications. Proof of exemption from such charges must be received in the office of the Oil and Gas Commission before said reports will be mailed.

RULE C-7. *Disposal of salt water.—A. Application, approval, and place of disposal.*—Salt water or other water containing minerals in such amount as to be unfit for domestic, stock, irrigation, or other general uses, upon application to, and approval by the Commission may be disposed of by injection into the following formations:

1. Non-producing zones of oil or gas-bearing formations that contain water mineralized by processes of nature to such a degree that the water is unfit for domestic, stock, irrigation, or other general uses.

2. All nonproducing formations containing water mineralized by processes of nature to such a degree that the water is unfit for domestic, stock, irrigation, or other general uses; provided, that before such formations are approved for disposal use, it shall be ascertained that they are separated from fresh-water formations by impervious beds which will give adequate protection to such fresh-water formations, and that fresh-water supplies contained by the proposed disposal formation near its outcrop shall be at such a remote distance as not to be endangered by addition of mineralized water in the proposed disposal wells.

The Commission, in passing upon applications for the use of nonproducing formations for disposal formations, will be advised by the technical recommendations of the State Geological Survey and the State Board of Health in determining whether such formations may be safely and legally used.

B. Casing and cement.—Disposal wells shall be cased and the casing cemented in such manner that damage will not be caused to oil, gas, or fresh-water resources.

C. Trial test—application, contents, and approval.—1. On application to, and approval by the Commission, trial tests may be made in the manner, and for such duration as the conditions justify and the Commission may permit.

2. The application for a trial test shall be verified and filed with the Commission showing:

(*a*) the location of the Disposal well.

(*b*) location of wells and names of landowners and lessees within one-half mile of the Disposal well.

(*c*) description of formation and top and bottom depth where disposal water is to be injected.

(*d*) elevation of the producing formations.

(*e*) disposal well log and description of Disposal well casing.

(*f*) such other information as the Commission may require to ascertain whether the disposal may be safely and legally made.

3. Approval for trial tests will be given by the Commission if, after investigation, it is found that the disposal may be safely made under the proposed plan.

4. Disposal water may not be injected into a disposal well for a longer period than a trial test without first complying with the requirements herein for permanent disposal.

D. Permanent disposal—Application, contents, notice, objections, hearing, and approval.—1. No disposal water shall be injected into a disposal well except for trial tests as provided in (C), until so ordered by the Commission pursuant to application and notice as herein required.

2. The application shall be verified and filed in triplicate with the Commission showing:

(*a*) the location of the disposal well, abandoned and drilling wells, and dry holes;

(*b*) the location of all oil and gas wells, including abandoned and drilling wells, and dry holes, and the names of the landowners and lessees within one-half mile of the disposal well;

(*c*) the name, description, and depth of the formation into which water is to be injected;

(*d*) elevations of the top of the producing formation in the disposal well, and in all producing wells within one-half mile radius, if the disposal water is to be injected into a lower horizon of an oil- or gas-bearing formation;

(*e*) disposal well log;

(*f*) description of the disposal well casing;

(*g*) location of wells producing water to be injected into the disposal well;

(*h*) the estimated minimum and maximum amounts of water to be injected daily;

(*i*) the names and addresses of operators notified of the application and the date that such notice was given;

(*j*) such other information as the Commission may require to ascertain whether the disposal may be safely and legally made.

3. Applications may be made to include the use of more than one disposal well on the same lease or on more than one lease.

4. Applications shall be executed by all operators who are to participate in the proposed disposal plan.

5. Notice of the application shall be given by the applicant by mailing or delivering a copy of the application to each operator of producing and drilling wells within one-half mile radius of the proposed wells within one-half mile radius of the proposed disposal well. Such notice shall be mailed or delivered on or before the application is mailed to or filed with the Commission.

6. Objections or complaints, stating the reasons why the proposed plan, as contained in the application, may cause damage to oil, gas, or fresh-water resources, must be filed within ten days after the application is filed.

7. In the event any such objection or complaint is filed or the Commission, on its own motion, deems that there should be a hearing on the application, a hearing shall be had after reasonable notice of the time, place and subject matter of such hearing has been given to the parties in interest.

8. Orders approving the disposal plan will not be made within ten days of the filing of the application unless the written consent of all persons entitled to notice is filed with the commission within such time.

E. *Notice of commencement and discontinuance of disposal operations.*—1. Immediately upon the commencement of disposal operations, the applicant shall notify the Commission of the same and the date of commencement.

2. Within ten days after the discontinuance of disposal operations, the applicant or the one in charge thereof, shall notify the Commission of the date of such discontinuance and the reasons therefor.

3. Before any disposal well shall be abandoned, notice shall be served on the Commission and the same procedure shall be followed in the plugging of such well as provided for the plugging of oil and gas wells.

RULE C–8. *Fluid repressuring and water flooding of oil and gas properties.—A. Application and approval.*—The owner or operator of any well may inject water or other liquids under pressure into the formation containing oil or gas for the purpose of obtaining oil or gas from the reservoir, upon application to and approval by the Commission.

B. Casing and cement.—Wells used for the injection of water into the producing formation or repressuring wells shall be cased with sound casing so as not to permit leakage and the casing cemented in such manner that damage will not be caused to oil, gas, or fresh-water resources.

C. Application, contents, notice, objection, hearing, and approval.—1. No liquid shall be injected into a well for flooding purposes until so ordered by the Commission pursuant to application, and notice as herein required.

2. The application shall be verified and filed with the Commission, showing

(*a*) the location of the Intake Well;

(*b*) the location of all oil and gas wells including abandoned and drilling wells and dry holes, and the names of landowners and lessees within one-half mile of the Intake well;

(*c*) the formations from which wells are producing or have produced;

(*d*) the name, description, and depth of the formations to be flooded;

(*e*) the open hole depths of each formation to be flooded;

(*f*) the elevations of the top of the oil- or gas-bearing formation in the Intake Well and the wells producing from the same formation within one-half-mile radius of the Intake Well;

(g) the log of the Intake well or such information as is available;

(*h*) descriptions of the Intake Well casing;

(*i*) descriptions of the liquid, stating the kind, where obtained, and the estimated amounts to be injected daily;

(*j*) the names and addresses of the operators;

(*k*) such other information as the Commission may require to ascertain whether the flooding may be safely and legally made.

3. Applications may be made to include the use of more than one Intake Well on the same lease or on more than one lease.

4. Applications shall be executed by all operators who are to participate in the proposed flooding plan.

5. Notice of application shall be given by the applicant by mailing or delivering a copy of the application to each operator of drilling or producing wells or wells which have been produced within one-half-mile radius of the proposed Intake Well. Such notice shall be mailed or delivered on or before the application is mailed to or filed with the Commission.

6. Objections or complaints, stating the reasons why the proposed plan as contained in the applications may cause damage to oil, gas, or fresh-water resources must be filed within ten days after the application is filed.

7. In the event any such objection or complaint is filed or the Commission on its own motion deems that there should be a hearing on the application, a hearing shall be had after reasonable notice of the time, place, and subject matter of such hearing has been given to the parties in interest.

8. Orders approving the flooding plan will not be made within ten days of the filing of the application unless the written consent of all persons entitled to notice is filed with the Commission within such time.

D. Notice of commencement and discontinuance of flooding operations.—1. Immediately upon the commencement of flooding operations, the applicant shall notify the Commission of the same and the date of commencement.

2. Within ten days after the discontinuance of flooding operations the applicant or the one in charge thereof shall notify the Commission of the date of such discontinuance and the reasons therefor.

3. Before any Intake Well shall be abandoned, notice shall be served on the Commission and the same procedure shall be followed in the plugging of such well as provided for the plugging of oil and gas wells.

E. *Records.*—The owner or operator of an Intake Well shall keep an accurate record of the amount of liquid injected into the Intake Well and such information shall be made available to the Commission or its agents.

RULE C–9. *Pressure maintenance or repressure with gas of oil and gas properties—A. Applications and approval.*—The owner or operator of any well may inject gas under pressure into the formation containing oil or gas for the purpose of obtaining oil or gas from the reservoir, upon application to and approval by the Commission.

B. Casing and cement.—Wells used for the injection of gas into the producing formation or repressuring wells shall be cased with sound casing so as not to permit leakage and the casing cemented in such manner that damage will not be caused to oil, gas, or fresh water resources.

C. Application, contents, notice, objection, hearing, and approval.—1. No gas shall be injected into a well for pressure maintenance or repressuring purposes until so ordered by the Commission pursuant to application, and notice as herein required.

2. The application shall be verified and filed with the Commission showing

(*a*) the location of the Intake Well;

(*b*) the location of all oil and gas wells including abandoned and drilling wells and dry holes, and the names of landowners and lessees within one-half mile of the Intake Well;

(*c*) the formations from which wells are producing or have produced;

(*d*) the name, description, and depth of the formations to be repressured;

(*e*) the open hole depths of each formation to be repressured;

(*f*) the elevations of the top of the oil or gas bearing formation in the Intake Well and the wells producing from the same formation within one-half mile radius of the Intake Well;

(*g*) the log of the Intake Well or such information as is available;

(*h*) descriptions of the Intake Well casing;

(*i*) descriptions of the gas, stating the kind, where obtained and the estimated amounts to be injected daily;

(*j*) the names and addresses of the operators;

(*k*) such other information as the Commission may require to ascertain whether the repressuring may be safely and legally made.

3. Applications may be made to include the use of more than one Intake Well on the same lease or on more than one lease.

4. Applications shall be executed by all operators who are to participate in the proposed repressuring plan.

5. Notice of application shall be given by the applicant by mailing or delivering a copy of the application to each operator of drilling or producing wells or wells which have produced within one-half mile radius of the proposed Intake Well. Such notice shall be mailed or delivered on or before the application is mailed to or filed with the Commission.

6. Objections or complaints, stating the reasons why the proposed plan as contained in the application may cause damage to oil, gas, or fresh water resources must be filed within ten days after the application is filed.

7. In the event any such objection or complaint is filed or the Commission on its own motion deems that there should be a hearing on the application, a hearing shall be had after reasonable notice of the time, place, and subject matter of such hearing has been given to the parties in interest.

8. Orders approving the repressuring will not be made within ten days of the filing of the application unless the written consent of all persons entitled to notice is filed with the Commission within such time.

D. Notice of commencement and discontinuance of repressuring operations.—1. Immediately upon commencement of the repressuring operations, the applicant shall notify the Commission of the same and the date of commencement.

2. Within ten days after the discontinuance of repressuring operations the applicant or the one in charge thereof shall notify the Commission of the date of such discontinuance and the reasons therefor.

3. Before any Intake Well shall be abandoned, notice shall be served on the Commission and the same procedure shall be followed in the plugging of such well as provided for the plugging of oil and gas wells.

E. Records.—The owner or operator of an Intake Well shall keep an accurate record of the amount of gas injected into the Intake Well and such information shall be made available to the Commission or its agents.

F. Individual cases.—The Board will make such special orders, rules, and regulations for the individual case as the conditions may justify.

GAS—CONTROL

RULE D-1. *Show cause for waste of casing-head gas.*—With the advent of three oil or combination wells in a field, pool, or area the operators therein shall appear before the Commission each month thereafter, to show cause why the casinghead gas so produced in the field or area and each of them cannot be utilized for:

(1) Light or fuel.

(2) Reintroduction into the oil-bearing horizon in order to maintain or increase the reservoir pressure.

(3) Any of the uses provided in Rule D-12.

RULE D-2. *Potential open flow.*—A. The potential open flow of all gas and combination wells, except those having an open flow of 750,000 cubic feet or less, shall be determined at least once each year and before such well shall be given an allowable.

B. The potential open flow of a well may be ascertained by Pitot Tube Measurements, computed according to the Commission's Table, Bureau of Mines method, or by other recognized methods.

RULE D-3. *Pressure test.*—The pressure in each gas or combination well, except those having an open flow of 750,000 cu. ft. or less, shall be determined as often as necessary to provide for ratable taking and before any such well shall be given an allowable.

RULE D-4. *Supervision of open-flow and pressure tests.*—All tests made in determining the potential flow and pressure of a gas well and used in calculating the allowable to a well shall be made under the supervision of the engineers of the Commission.

RULE D-5. *Duration of tests.*—The open-flow and pressure tests shall continue for such duration and at such intervals as may be necessary to accurately determine the same.

RULE D-6. *Notice of tests.*—The open-flow and pressure tests may be witnessed or observed by a representative of any producer in the field and the owners of the adjoining or offset leases must be notified by the owner of the well on which a test is to be taken, stating the time when said test will commence.

RULE D-7. *Gas to be metered.*—All gas produced from the deposits of this State shall be accounted for by measurement and reported to the Commission either by the producer or by the purchaser of the gas. Where gas is delivered to gasoline-extraction plants or gas pipe-line companies for light and fuel, oil and gas development including drilling, gas lift and repressuring, gasoline extraction before redistribution as residue, the company operating the gasoline-extraction plant or gas pipe line shall be responsible for the reporting of that portion of the gas taken by them and shall make a separate report for each field or reservoir from which the gas is taken and shall make a separate report for sweet, sour, and casinghead gas taken in each field or reservoir. If any producer or well owner is taking gas from a well or wells for any purpose whatsoever which gas is not delivered to a purchasing company or person and not reported to the Commission, said producer or well owner shall make a report of such gas to the Commission on forms furnished, upon request, by the Commission. Provided, however, that gas produced incident to the production of oil, where not sold, shall only be measured and reported when ordered by special order of the Commission, and that gas used for development purposes of a temporary nature in the same reservoir or field from which it was produced, or gas used for lease purposes such as lease houses, boiler stations, crude-oil heating and treating plants, and salt-water-disposal plants when not sold need not be metered but must be accounted for by estimate based upon its use and reported to the Commission. The record of the measurement or estimate, whether it be for the individual well or the entire property, shall be kept in a permanent file and made available to the Commission's representative at all times.

RULE D-8. *Reports from gas purchasers.*—Each purchaser, pipe-line company, or gasoline-plant operator taking gas from wells classified as gas wells by the Commission shall prepare a monthly report upon forms furnished by the Commission according to instructions contained within the report. Among other things, said report shall contain the closed pressure each month and the proven contiguous acreage under lease or contract on which the gas well is located up to the maximum number of acres in the specified drainage area for that field, which will represent the acreage to be used in the preparation of the proration schedule.

RULE D-9. *Gas-oil ratio.*—No well shall be permitted to produce gas in excess of the maximum ratio determined for a common source of supply unless all gas produced in excess thereof is returned to the common source of supply from which it was produced.

RULE D-10. *Gas-oil ratio surveys and reports.*—By special order the Commission will authorize periodic gas-oil ratio surveys and reports to be filed on forms furnished by the Commission and including thereon for each well:

Field, reservoir, and county in which the well is located; lease name and well number; elevation; producing formation; size and length of tubing; size and length of casing (oil string); size choke (if pumping well, so designate); tubing pressure, casing pressure, and trap pressure; production of water; oil and gas (in thousands of cubic feet) during the test; gas-oil ratio; and the A. P. I. gravity of the oil; duration of test.

All data requested is for each well separately and the gas-oil ratio shall be determined according to the following procedure:

(*1*) *Flowing wells continuously produced.*—The oil flow shall be stabilized during the 24-hour period immediately preceding the test at a rate fixed as nearly as possible to its allowable as shown on the Commission's current oil-proration schedule. Major adjustments in the rate of flow shall be made during the first 12 hours of the stabilization period and only minor adjustments made during the last 12 hours. No adjustments shall be made during the time in which the well is being tested and the rate of production during the test shall not be less than the well's daily allowable. Should gas be withdrawn from the casing in an attempt to maintain a fluid seal, or for any other reason, this volume of gas must be added to gas produced through tubing in computing the gas-oil ratio.

(*2*) *Flowing wells intermittently* (*stop-cocked*) *produced.*—In computing the operating gas-oil ratio the total volume of gas and the total barrels of oil that are produced in order to obtain the daily oil allowable must be used regardless of the flowing time in the 24-hour period.

(*3*) *Gas lift or jet wells.*—The total volume of gas to be used in computing the operating gas-oil ratio is the total output volume minus the total input volume.

(*4*) *Pumping wells.*—Should gas be withdrawn from the casing in an attempt to maintain a fluid seal, or for any other reason, this volume of gas must be added to gas produced through tubing in computing the gas-oil ratio.

RULE D–11. *Pipe-line maps.*—Pipe-line maps indicating the location, size, extensions, and any portions abandoned or not used shall be filed at the request of the Commission.

RULE D–12. *Gas utilization.*—After the expiration of seven (7) days from the time of encountering gas in a gas well, no gas from such well should be permitted to escape into the air, and all gas produced therefrom shall be utilized for the following purposes:

(A) No gas well gas shall be utilized except for:

(1) Light or fuel.

(2) Efficient chemical manufacturing.

(3) Bona fide introduction of gas into oil, or gas bearing horizon, in order to maintain or increase the reservoir pressure or otherwise increase the ultimate recovery of oil or gas from such horizon.

(4) The extraction of natural gasoline therefrom when the residue is returned to the horizon from which it is produced.

(B) Casinghead gas may be used for any beneficial purpose.

(C) Any producer of gas may use the same as gas lift in the bona fide production of oil where such gas is not used in excess of ten thousand (10,000) cubic feet per barrel of oil produced; provided that in order to prevent waste in any case where the facts in such warrant it, the Commission may permit the use of additional quantities of gas to lift oil, provided all such gas so used in excess of ten thousand (10,000) cubic feet for each barrel of oil shall be processed for natural gasoline when same is reproduced.

RULE D–13. *Use of gas for other than light or fuel.*—Before any person shall engage in the utilization of gas for purposes other than light and fuel he shall file with the Commission a verified statement setting forth the names and addresses of the person or persons who are to engage in the proposed operation, the location of the plant or plants where the proposed utilization is to be carried on, the kind and the probable volume of the gas that is to be used, the reservoir from which it is to be taken, the general type of the process, and the kind and condition of the equipment that is to be used, the results to be obtained insofar as such results can be reasonably anticipated, and such other pertinent facts as the Commission may require. Upon filing said statement, the Commission may, if it deems the same necessary, conduct a public hearing with reference to the proposed utilization in order to determine whether such utilization or the use of the proposed processes and equipment will constitute waste.

RULE D–14. *Gas assessment* (*fields discovered after January 1, 1937*).—An assessment to pay the conservation expenses and other costs in connection with administration of gas conservation, not otherwise provided for shall be made as follows:

(A) There shall be assessed against the persons involved, a charge not to exceed one-half (½) mill on each one thousand cubic feet of gas produced, sold, marketed, or used each month from a gas well. Said assessment shall apply only to the first purchase of gas, or the original taking from the well, and not the subsequent transfers commonly referred to as "tenderships."

(B) The first purchaser of the production, who is hereby defined to be the party paying for either or both any working interest or royalty interest, shall, before paying for the production deduct one-half (½) mill for every thousand cubic feet of gas produced and removed from the lease each month, and remit the amounts so deducted to the Commission at the same time and periods as said purchasers make their regular gas payments.

(C) Said remittances may be made each month in a single check if the purchaser so desires and no accounting by the purchaser shall be required except to show all deductions on the regular payment statements to producers and royalty owners or other parties in interest.

(D) The assessment herein provided for shall not apply to gas which is being returned to the ground for repressuring or pressure maintenance purposes within the field, but shall apply to such gas as is produced and removed from the lease and returned to the ground for storage purposes.

(E) Any person purchasing gas in this state at the well, under any contract or agreement requiring payment for such production to the respective owners thereof, in respect of which production any sums assessed under these rules are payable to the Commission, is hereby authorized, empowered, and required to deduct from any sum so payable to any such person the amount due the Commission by virtue of any such assessment and remit that sum to the Commission.

Further, any person taking gas from any well in this state for use or resale, in respect of which production any sums assessed under the provisions of this rule are payable to the Commission, shall remit any sum so due to the Commission in accordance with these rules and regulations.

TRANSPORTATION

RULE E–1. *Pipe lines, purchasers, and transporters.*—(A) No carrier by pipe line and no gathering system shall transport oil from any lease or wells to which the said pipe line or gathering system has reason to believe the owner or operator of said lease or wells to which it is connected has violated any rule, regulation, or order of the Commission or any conservation laws of this State with reference to oil and gas.

(B) No pipe line company shall transport oil from any gathering system which the said pipe line company has reason to believe has violated any rule, regulation or order of the Commission or any conservation laws of this State with reference to oil and gas. It shall be the duty of the pipe line company to suspend transportation of any oil from said gathering system until such time as such pipe line company is notified in writing by the Agent of the Commission that the violation on the part of the gathering system has been discontinued and that the gathering system is complying with the rules, regulations, and orders of the Commission and the conservation laws of the State of Arkansas.

(C) In order to carry out the spirit and purposes of this and other regulations tending to provide orderly production of crude oil without waste and to give equal opportunity for marketing oil to all operators bringing wells into production in said field, all pipe line companies are hereby directed to make connection of their lines to the lease tanks on properties or leases in rotation as wells are completed, regardless of ownership. Connections shall be accepted and taken by the pipe line which by georgraphical location and least expense is the logical connection unless some other line is willing to accept the same. All wells which are at the present time unconnected shall be given connection by the pipe line to which the same are or may be allocated before the owners of such pipe lines make connections to their own wells or wells of affiliated companies.

(D) Every truck, tank wagon, and other vehicle, moving, hauling, and transporting crude oil, pit oil, wash oil, residue oil or any of its refined products shall have the name of its owner and the number of such truck, tank wagon or vehicle plainly stenciled on each side thereof, and all vendors of oil moved by trucks, transporting any of the types or kinds of oil herein mentioned, except refined products of petroleum, shall make report of movement of such oil on forms prescribed by the Commission for that purpose and each and every operator or driver of such truck shall have in his possession a signed copy of such report or ticket showing the name of truck owner, name of driver, truck number, truck license number, number of barrels of oil being transported, source from which oil was obtained, signature of vendor of oil, and type of oil handled, whether crude oil in natural state, wash oil, residue oil, tank bottom oil, or pit oil, name of vendee and point of delivery.

RULE E-2. *Reports from oil pipe lines or transporters.*—All transporters of crude oil doing business in the State of Arkansas shall make monthly reports to the Oil and Gas Commission, showing the wells connected with their lines during the preceding month, the names of the owners of said wells, amount of production taken therefrom during said month, all on forms to be provided by the Commission. Said reports shall be sworn to by a responsible officer of the company making the report and shall be filed with this Commission on or before the 15th day of each month covering purchases of transported or pipe line runs of the preceding month.

PROCESSING

RULE F-1. *General order.*—The Commission will, if deemed necessary, issue special rules, regulations, and orders relating to the erection and operation of any plant or factory separating products from oil or gas or both.

RULE F-2. *Refinery reports.*—On or before the 15th day of each calendar month the owner, manager, or operator of each and every refinery, processing plant, topping plant, blending plant, or other plant at which crude petroleum oil or its products is processed or manufactured (except natural gasoline plants hereafter provided for), situated within the State of Arkansas shall file in the office of the Commission a report concerning the operations of such refinery or plant during the next preceding calendar month, on forms to be provided by the Commission.

RULE F-3. *Gasoline plant reports.*—Each operator of a natural gasoline plant in the State of Arkansas shall file with the Commission a report on or before the 15th day of each month upon a form furnished by the Commission and according to the instructions contained on the form covering operations at the gasoline plant for the preceding month.

Mr. BAILEY. As you can see, our general rules and regulations are divided into five sections and the subject of the rule under each section is as follows:

SECTION A. ADOPTION ORDER AND INDEX

This section contains the issuance policy of general rules, special rules, and emergency rules; defines the terms used throughout the wording of the rules, and the index.

SECTION B. DRILLING—CONSERVATION

Covered in this section are application to drill; drilling bond; spacing of wells; identification of wells; drilling and electrical logs; protection of subsurface oil, gas and water; notice of intention to plug and abandon wells; plugging methods and procedure; affidavit on proper plugging completion; methods, affidavit, and so forth, concerning the plugging of seismic and other exploratory holes; fresh-water wells; casing pullers' permits and bonds; organization reports; surface equipment; casing requirements; blow-out prevention; drilling fluid; well-head fittings; proper well-testing hours; cleaning of wells; boiler or light plants; disposition of rubbish or debris; tubing; chokes; separators; fire or pollution walls; salt water; disposition of emulsion, B. S., and waste oil; casing tests; deviation drilling tests; shooting, perforation, and drilling reports; prohibition of vacuum pumps; production practice; fire, breaks, leaks, or blow-outs; the determining and naming of common sources of supply; ratable taking of oil required.

SECTION C. OIL—PRODUCTION CONTROL

Under this section are found rules concerning the oil pools that are to operate under restricted production; reports to be made by purchasers and producers; reservoir surveys; assistance of operators in surveys; oil conservation assessment; monthly reports or schedules; disposal of salt water; fluid repressuring and water flooding of oil and gas properties; pressure maintenance or repressure with gas of oil and gas properties.

SECTION D. GAS—PRODUCTION CONTROL

Here are found methods for determining the production for gas wells, notice to show cause for waste of casing-head gas, pressure tests, supervision of tests, duration of tests, gas to be metered, reports from gas purchasers, gas-oil ratio requirements, gas-oil ratio surveys and reports, pipe-line maps, utilization of gas, use of gas for other than light or fuel purposes, and gas conservation assessment.

SECTION E. TRANSPORTATION OF OIL OR GAS

General rules for the operation of pipe lines, other means of transportation, and the requiring of reports.

SECTION F. PROCESSING, OIL AND GAS

This section contains only three rules and they deal with the issuance of further rules, the requiring of refinery reports, and the requiring of natural-gasoline plant reports.

The commission requires only 9 nonrecurring forms and 9 recurring forms from the industry. These are divided by the sections given above: Section B: 6 nonrecurring, no recurring. Section C: 2 nonrecurring, 2 recurring. Section D: No nonrecurring, 2 recurring. Section E: 1 nonrecurring and 4 recurring. Section F: 1 nonrecurring and 2 recurring forms.

By a special order the commission requires the obtaining of certificates of clearance to transport oil in this State. This system of tenders or certificates is patterned very closely after that of the Federal Tender Board, inasmuch as they assisted in the drawing of the forms.

I am filing a copy of this order as part of my statement and am marking it exhibit 2.

In addition to our general rules and regulations, the commission issues, after notice of hearing, special rules and regulations that are known as special field orders for each of the fields operating under production control. A sample of this type order is that of the Buckner field of Columbia County, and I am filing a copy of that order with my statement, identifying it as exhibit 3.

And in this connection, while I will refer to it later, but even though we have the general rules we issue special rules for each field, because each field must be treated separately. We cannot issue any orders of State-wide application that will cover the conditions arising in each field.

These field orders contain eight specific rules concerning the operation of that field, as follows:

RULE I. GENERAL

This rule adopts the rules and regulations of State-wide application, which I have already discussed.

RULE II. SPACING OF WELLS

Ordinarily these rules require 40-acre spacing and contain a proviso for the granting of exceptions to the designated spacing.

The proviso specifically states that an exception will not be granted unless a well drilled as required would be outside the pool, or topographical conditions would make the drilling of the well unduly difficult.

RULE III. DRILLING UNIT

This requires the establishment of a drainage unit, or the area which one well will effectively drain, the area, of course, being the area set out in rule I. This rule also provides that when two or more separately owned tracts of land are embraced within the established drilling unit, the owners thereof must agree to integrate their interests and develop the lands as a unit either voluntarily or by commission order.

So far it has not been necessary to issue but one integration order, inasmuch as the lease and royalty owners have been able to agree upon terms of integration.

RULE IV. CASING PROGRAM

Under this rule, requirements are made for the placing and proper cementing of surface casing or casing set to prevent the pollution or intrusion of surface waters; intermediate casing to prevent the danger of blow-outs, and so forth, and a producing string of casing placed on top of or into the oil formation.

The engineers of the commission are required to test all well casing to see that it is properly set and is of specified size and weight.

RULE V. COMPLETION

This rule prohibits any pipe-line company or other purchaser from transporting oil from any well in the pool until the well has been inspected by the engineers of the commission and the commission is satisfied that all rules and regulations have been abided by. Should the inspection prove satisfactory, a certificate of clearance is issued to the operator and to the transporter.

RULE VI. ALLOCATION OF PRODUCTION (OIL WELLS)

This rule merely states that the commission shall decide the total quantity of crude oil which may be lawfully produced daily from a pool and will allocate the production to the various wells and leases in the pool. The commission determines the amount of oil which should be produced upon what is known as the optimum equitable rate-of-production basis. Simply stated this is:

> The greatest recovery of oil with the minimum quantity of gas for each pound reservoir pressure used from the reservoir as a whole and the production from the reservoir distributed in a reasonable, practicable manner so that avoidable drainage is prevented and equity assured the owners of the reservoir oil.

The deciding factor in the monthly allocation of oil on this basis is the comparative rate of decline in reservoir pressure per unit of crude oil produced, determined as follows:

Early each month, our engineers go into the fields and pools with their bottom-hole pressure and gas-oil units and determine the condition of these reservoirs under the prevailing production quotas. All of the wells are closed to production, when possible, while the engineers test the necessary key wells. The operators usually have their witnesses present in a cooperative sense.

All parties in interest are then advised of their findings, by publication, and the comparative findings of the previous month and months in order that there will be sufficient time prior to a hearing for all to be advised of the physical conditions existing.

At the hearing, large charts are displayed containing progressively the bottom-hole pressure, gas-oil ratio, and production rates by months. There is one for each pool and visual comparison can be made of monthly recovery efficiency as well as cumulative. The difference in the recovery of oil and gas for each pound drop in bottom-hole pressure as between pools is reconciled by the published findings of the engineers which contains the difference in depth, area, type, ratio, type structure drilling, and so forth.

I have some of those charts, but they do not have a place here to display them.

We have never experienced any difficulty in reaching a decision as to whether or not the production should be increased or decreased from that of the previous month or months for any pool, the simple reason being that the formation we are able to present is a clear indication of whether or not it is to the best physical interest to change the rate of production. We have, of course, experienced times when there was not a market for all of the oil indicated as the optimum rate, and, therefore, to prevent the building up of unnecessary storage and to provide ratable taking, the rate has been set below the possible maximum. This protects the corelative rights of all the owners.

The success with which we have been able to control the production of these fields from a physical standpoint is plainly demonstrated in this comparison:

I have a chart, which I will not read.

(The chart referred to is as folows:)

Comparison of physical state of regulated pools before and after effective date of present proration law

Field or pool	Spacing pattern	Months operated	Wells drilled	Acreage added	Bottom hole pressure change [1]	Barrels produced	Average ratio [2]	Barrels rec. per pound drop
PRIOR TO APR. 1, 1939								
Atlanta	40	4	1	40	−31	2,035	837	66
Buckner	40	16	10	400	−288	481,225	350	1,671
Magnolia	40	13	18	720	−62	391,092	750	6,308
Schuler-Jones	20	19	124	2,480	−885	6,912,961	800	7,811
Schuler-Reynolds	40	18	14	560	−200	721,244	10,976	3,606
Village	40	11	5	200	−52	115,401	10,000	2,219
APR. 1, 1939, TO JAN. 1, 1940								
Atlanta	40	9	4	160	0	86,751	1,500	(3)
Buckner	40	9	8	320	−77	530,890	210	6,895
Magnolia	40	9	61	2,440	−60	3,457,484	875	57,624
Schuler-Jones	20	9	15	300	−325	3,876,064	1,125	11,926
Schuler-Reynolds	40	9	2	80	+70	630,374	875	(3)
Village	40	9	6	240	+17	252,036	7,862	(3)
Big Creek	40	1	1	40	(4)	(4)	(4)	(4)
Dorcheat	40	4	3	120	−27	42,823	4,000	1,586
Lewisville	20	8	12	400	−215	144,603	650	673
COMPARISON AND RESERVOIR TYPE								
Atlanta, water drive							+663	(3)
Buckner, water drive							−140	+5,224
Magnolia, water drive							+125	+51,316
Schuler-Jones, gas drive							+325	+4,115
Schuler-Reynolds, combination							−10,101	(3)
Village, combination							−2,138	(3)
Big Creek, may be gas field [5]								
Dorcheat, may be gas distillate [5]								
Lewisville, combination [5]								

[1] Bottom hole pressure change in pounds per square inch.
[2] Gas produced per barrel of oil in cubic feet.
[3] No change or gain in pressure.
[4] Gas distillate shut in.
[5] New field.

Keeping in mind that the objective is to refrain from decreasing the reservoir pressure at all if possible, and where it is necessary (as in a gas-driven pool) to recover the largest quantities of oil with the smallest quantities of gas per pound pressure reduction, this comparison can be made.

In the Atlanta pool, Reynolds lime of the Schuler field and Village pool gains in reservoir pressure were obtained. The Buckner pool recorded an increase of 5,224 barrels, Magnolia an increase of 51.316 barrels, and the Jones pool of the Schuler field an increase of 4,115 barrels for every comparative pound of reservoir pressure used.

RULE VII. METHOD OF ALLOCATION (OIL WELLS)

At the close of 1939 there were seven fields in Arkansas operating under controlled production. The allowable for each of these fields is set monthly by the commission immediately after the State-wide hearing which is held monthly or bimonthly. The daily field allowable is then distributed to the various wells in the field, on the basis of the proration formula in effect.

Atlanta, Buckner, Magnolia, Schuler-Jones, and Reynolds lime pools are prorated by the acreage times bottom-hole pressure method, while Village is prorated by a volumetric control formula and Dorcheat is temporarily granted a per well allowable until the engineers complete their work in the pool.

The acreage times bottom-hole pressure formula is applied by multiplying the assigned acreage of each well by the bottom-hole pressure of that well (bottom-hole pressure of wells taken monthly by commission engineers) and the total acre-pounds for each well computed. The total acre-pounds for all the wells in the field is divided into the total field allowable and a factor obtained. This factor represents the amount of oil 1 acre-pound may receive. By multiplying the factor by the acre-pounds of each individual well, the allowable of that well is obtained.

The volumetric control formula is computed for each well by calculating the oil and gas as volume of space in the reservoir at the average field pressure and allocating proportionately to individual well acre the space converted to oil on the surface, so that each well has equal reservoir voidage.

I am filing our oil-proration schedule for the month of February 1940, as part of my statement and identifying it as exhibit 4. The schedule is self-explanatory.

RULE VIII. GAS LIMIT

From the sample field order given you, you will notice that in that particular pool—the Buckner pool—the gas-oil ratio is set at 1,000 cubic feet of gas per barrel of oil produced. It is not possible for oil to be produced with a given quantity of gas, as the quantity of gas will vary with the characteristics of the producing formation from pool to pool. Therefore, our specified ratios vary from a low of 1,000 to a high of 8,000 cubic feet. Differences in ratios are brought about primarily by two conditions: (1) Method of completing the well, and (2) position of the well upon the producing structure. Our practice has been to determine through appropriate tests, by our engineering department, if a well is completed properly or not. If not, the operator of that well is requested to recomplete his well and reduce the quantity of gas produced with the oil. If the well is so situated on the producing structure that it has an inherently high gas-oil ratio, then the quantity of gas and the quantity of oil that that well may produce is adjusted so that the operator will not have undue advantage in the utilization of reservoir energy over the other operators in the field or pool.

Each and every pool is treated as a separate unit, and the particular producing characteristics of that unit or particular wells within the unit determine the production quota for it. We do not feel that any two pools can be so identical that the same yardstick of efficiency and effectiveness of so many barrels a day will apply alike.

We are in position to and will apply progressively the fact-increasing scientific knowledge of oil-and gas-production practice—in a reasonable, practical manner.

We have over 12 years' supply of oil in sight, our reserves are increasing, and the expected ultimate recovery from these reserves is also increasing by the application of sound engineering principles—principles that our people understand and approve.

Since the discovery of oil in our State, it has played a major part in Arkansas economy. Even though oil is produced at present in only 6 of our 75 counties, it has brought millions of dollars to our farmers and other landowners through lease rentals, lease bonuses, and oil royalties.

More than half of the State's revenue is traceable to the oil and gas industry. In 1939 tax moneys paid to Federal, State, and city governments directly traceable to the petroleum production and natural-gas industry in Arkansas was $1,348.579, including severance tax, oil and gas well permit fees, corporation tax, real- and personal-property tax. In 1939 the value of petroleum, natural gas, and natural gasoline was $17,966,239, or 67 percent of the value of all minerals. In addition, the petroleum industry and its customers in Arkansas paid in 1939 in special taxes $14,579,992.

Our old stripper wells constitute 90 percent of our total wells, even if they only represent a production of nine barrels a day each. They represent wage earners, people, and pay rolls, as well as recoverable oil reserves, and the economic welfare of many communities is entirely dependent upon them.

As Governor Bailey stated to you yesterday, the legislature, in designating the location of the administrative office of the commission, provided that it should be located, not at the State capital, but at the county seat or some county in which oil or gas is produced.

Thus every farmer, banker, oil operator, royalty owner, or landowner is within easy reach of our commission, and the commission will hear them. They can see what we are doing; our records are public and easily accessible.

This is vastly different from H. R. 7372, which provides for a commissioner with offices to be located in Washington, D. C.

I believe the members of this committee will agree with me that it is better to keep the Government near the people, if the same results can be obtained, than to have it administered by long-range or remote control.

We neither want nor need the untried theory of Federal supervision substituted for our proven, practical methods of conservation—methods that are preventing waste, assuring the maximum in recovery, and providing equity in production.

We ask to be allowed to continue to work out our own problems and to retain that priceless heritage of a free people—local self-government.

Mr. COLE. Mr. Bailey, may I ask you one or two questions?

Mr. BAILEY. Yes, sir.

Mr. COLE. Of course, your Arkansas law is different from the law of other States. It makes no reference to market demands whatsoever.

Mr. BAILEY. The words "market demand" are not used. There is no special reference to it, Mr. Chairman; but in the preamble to the act and throughout the act you will find this clause:

> To protect the vested coequal or corelative rights of owners of crude oil and natural gas as defined in this act.

We also find throughout the act that it stresses very forcibly the question of ratable taking.

As stated previously, we try to determine the rate of production upon the physical characteristics of the pool, the optimum rate, in order to secure the greatest ultimate recovery. Sometimes a pool may suffer from lack of market. One operator may have a market for his oil and another operator does not. The pool can produce, we will say, a maximum of 10,000 barrels per day. We only have pipe-line facilities for half that amount. We do not allow this operator [indicating] to produce his full 5,000 barrels per day from his wells. He is required to take ratably from all of the wells in the pool. This protects the small operator, because he is the man who usually gets pinched in cases like that. The major companies, the larger operators, usually have their own pipe lines, and the small individual operator has none; and if we did not have this provision in our law, then they could easily force him out of the picture.

Mr. COLE. Is the demand for Magnolia crude greater than the current allowable; do you know?

Mr. BAILEY. I will state this, that at all of our hearings regarding the Magnolia and the Schuler field, and other fields, the operators usually ask us to set allowables higher than the optimum rate. In other words, they want more than the orders usually permit. At our last hearing we did not have any requests for an increase in allowables for the Magnolia field.

Mr. COLE. Information has come to me that the demand for Magnolia crude is generally said to be about twice the current allowable. You are unwilling to accept that statement?

Mr. BAILEY. Mr. Chairman, my observation, from my experience of the past 3 years—I was chairman of the old Board of Conservation and at present I am chairman of the Oil and Gas Commission—is that the requests from the operators themselves can hardly be fixed as the basis for demand. They usually ask to be allowed to produce more perhaps than they have a market for. We had an occasion about a year ago in the Schuler field where the allowable production was 25,000 barrels of oil per day. They had a market for that much oil. We cut the production almost in half because of the excessive decline in bottom-hole pressure.

Mr. COLE. What is done with the gas in the Magnolia field?

Mr. BAILEY. At the present time, the gas is being vented after it goes through separators, goes out vent lines in flares. However, one of the companies is building a gasoline plant, gasoline extraction plant, in that field, and by the 1st of March, I believe, perhaps the middle of this month, it will be in operation, and they will extract the gasoline from this gas. However, let me say further that the gas content in all of our fields, our new fields, is what is known as a sour gas. It has a very high hydrogen sulphide content, and as such is unfit to be used for domestic purposes. It can only be used after it has been treated, and I do not think there has ever been any attempt to treat this in a wholesale manner. Perhaps it is being treated in some of the fields, for use in company houses, or other lease purposes. And we are working now to try to find some use for this byproduct. Our engineers, in connection with the Utilities' Commission, are trying to work out something.

Mr. COLE. Do you know the capacity of the plant which is to be opened this month; the plant to which you refer?

Mr. BAILEY. It will process approximately fifteen to twenty million feet of gas per day, which is about the output of the field.

Mr. COLE. How about the Schuler field; is there much waste of gas there?

Mr. BAILEY. The Schuler field gas is used at the present time for uses on the leases for lease purposes. Also one company there and a refinery is using this gas in their refinery, and I think one or two of the companies are using it up in the old Smackover field for running their engines and other uses.

Mr. COLE. Is it correct, Mr. Bailey, that in the Schuler field, where I understand there is considerable gas being blown into the air—in fact, you can hear it for some distance, can you not?

Mr. BAILEY. Not at the present time.

Mr. COLE. Has that been stopped?

Mr. BAILEY. Well, there are a few small gas flares, but a majority of it. I would say about 75 percent of the gas, is being used in these other methods and in the refinery.

Mr. COLE. Do you have any records showing the gas-oil ratio in the Jones pool of the Schuler field?

Mr. BAILEY. I will just refer to my records.

Mr. COLE. I would like to know whether that has increased, and if so what the average reservoir pressure has dropped to, saying in the past 2½ years.

Mr. BAILEY. The ratios vary from a low of 800 to 1 to a high of 2,000 or over and the ratios are higher nearer the top of the field up near where we have what is known as the gas cap. The ratios are usually lower around the edges of the pool. There has been very little change in the ratios during the past 2 years. I have a chart here which illustrates this graphically.

Mr. COLE. This is the field I am speaking of [indicating on chart].

Mr. BAILEY. Yes, sir; the Jones pool of the Schuler field.

Mr. COLE. The members of the committee, I think, would like to have you show that to us.

Mr. BAILEY. Here is one of our regular charts showing original reservoir pressure of 3,520 pounds.

Mr. COLE. And it dropped to what? That is an average of 2,310, is it not [indicating]?

Mr. BAILEY. An average of 2,310 pounds. Now, here is our daily rate of production [indicating on chart].

You will notice here when we had 25,000 barrels daily that we had a sharp decline. We cut the production down to 15,000 barrels a day, where it remained constant since, and the rate of decline has been much less.

There has been, though, a constant decline here [indicating] in our gas-oil ratios. There has been a decline in bottom hole pressure in that field except during the August shut-down, and we did have an increase during that time of 82 pounds.

Here in the same Schuler field, about 100 feet under this, is the Reynolds lime or the Smackover lime. That is shown here on this chart [indicating].

Mr. COLE. What are the depths in that field?

Mr. BAILEY. The Jones sand is approximately 7,500 feet; the Reynolds lime [indicating] is approximately 7,600 feet.

Mr. COLE. Then this is only 100 feet over that [indicating]?

Mr. BAILEY. That is right. But that shows of necessity, Mr. Chairman, that you cannot set any ratio or any set rule even for one pool that will govern other pools, because it has got to be governed by the producing characteristics of that particular pool.

Mr. COLE. That is what you take into consideration as the controlling factors in allocating the ratios to the respective fields?

Mr. BAILEY. That is right. You notice in this pool the Reynolds limes [indicating on chart], we had a virgin pressure of 3,500 pounds. At the present time it is 3,420. We have only lost very little pressure.

Now, early in the life of the field before we had regulation of gas-oil ratios, that [indicating] was much higher. The discovery well was completed in the gas cap and had a very high ratio. Later it was recompleted in the oil zones with a resultant decrease in gas-oil ratios.

Mr. COLE. Mr. Kelly wants to ask you a question.

Mr. BAILEY. Yes, sir.

Mr. KELLY. On especially the taxes paid by the industry in your State last year of some $14,500,000, were those State taxes or Federal taxes; or what portion of them were Federal taxes, if you know?

Mr. BAILEY. I cannot give you the exact proportion. That represents all of the taxes, including gasoline and severance taxes, and I believe there is a small Federal production tax.

Mr. KELLY. Both State and Federal taxes?

Mr. BAILEY. Both State and Federal; all taxes paid by the industry.

Mr. KELLY. Thank you.

Mr. WOLVERTON. Mr. Bailey, can you give some explanation for the shut-down on August 16 last?

Mr. BAILEY. Yes, sir; I will be glad to.

We had a situation in Arkansas, as our law provides, that if any operator is aggrieved at any act of the commission, he has the right of review by the courts. We held a hearing on the 27th of July. At that time two of the principal operators in the Schuler field asked us to change our proration formula, and I would like to read briefly into the record what that formula was.

Prior to the passage of our act we had adopted what is known as an acreage plus pressure formula. After the passage of the act we adopted a rule changing it to acreage times pressure, which we thought was more equitable and in compliance with our act.

This expert that they had on the stand—he consumed a lot of time, but I finally asked him this.

If he thought that the formula we were using was better than the formula we had been using prior to the passage of the law. It had in mind, of course, this acreage times pressure. That is the formula used by the commission at the present time. He said:

> We are not taking the stand and it is not my opinion anyway that that formula is no good. I think it is an improvement over the acreage plus pressure. I do not think there is any question about it. I think it is a better formula. And it has a tendency toward the same thing that we are striving for, but we believe that the acre-feet times pounds goes further and will accomplish more than the straight acreage times pressure.

This was on the 27th of July. After the hearing we did not make the change. but they brought up a great many questions. They were talking of the migration of oil from the center of the structure to the edge and they had notified us definitely that they were preparing to sue us.

Well, now, there is no one who likes a lawsuit, unless it is an attorney. I know I do not. I dislike them.

So we thought if they were going to sue, we had better find out a little bit more about our structures, especially the Jones sand. So the only way we knew to determine whether or not there was any migration of oil, this wrong they complained of, was to shut the fields down and make proper bottom-hole pressure tests, and we shut down; issued a shut-down order for prorated fields.

Mr. WOLVERTON. Is that the only reason you had for shutting down?

Mr. BAILEY. Well, after we issued the shut-down order, we had one company that did not shut down. They proceeded to flow their wells as they did before and applied to the court for an injunction. The case was tried out in our chancery court. I will read you here the allegations in their complaint.

Mr. WOLVERTON. Did any other States shut down at the same time?

Mr. BAILEY. I will get to that in just a minute if you will permit me to finish this, Mr. Wolverton.

Mr. WOLVERTON. Certainly.

Mr. BAILEY. Among other allegations, they state this:

> That there was not at the time of the execution of the order, nor has there since been, any necessity for the Commission to prohibit the production of oil or gas from any field or pool in the State of Arkansas for the purpose of investigating the physical condition of any such field or pool through tests or otherwise.

Here is another allegation made in their complaint:

> That the Commission did not enter that order for the purpose of preventing waste, but entered said order under the guise of prevention of waste for the unlawful purpose of attempting to affect the price of oil produced in the State of Arkansas.

Now, as I stated, the case was tried in the chancery court. I will read briefly from this decree:

> The case was submitted to the court upon the complaint of the plaintiff and the defendant thereto, the answer and cross complaint of the defendant and answer thereto, and upon oral testimony and other evidence adduced by the plaintiff in support of the allegations of his complaint.

When the case was over the court in the decree decided in favor of the Commission, and the finding of a trial court in the State of

Arkansas is conclusive until and unless reversed by an appellate court.

Mr. Wolverton. Did you close down at the same time other States closed down?

Mr. Bailey. Approximately the same.

Mr. Wolverton. What reason did they have for closing down; did you look into that?

Mr. Bailey. I expect you had better ask them, Mr. Wolverton.

Mr. Wolverton. It seems to me to be a rather strange situation that your State would shut down; Texas shut down and all of the other States shut down on or about August 16. Now, each gives a different reason, but the fact is they all shut down on August 16, at the time one of the oil companies reduced its offered price for oil. The Associated Press carried a story that it was done to bring that company into line and prevent others following the same course.

Now, just tell me something about that. You have given the reason that a court in your State gave for sustaining what you have done, but I would like to know what part your State had in this general plan to stop production in Arkansas.

Mr. Bailey. You are an attorney, are you not, Mr. Wolverton?

Mr. Wolverton. Yes.

Mr. Bailey. Would you say as an attorney, that you should go behind the decree of a trial court?

Mr. Wolverton. You mean that you do not want me to inquire about what you did?

Mr. Bailey. Yes; I would like for you to inquire.

Mr. Wolverton. That is what I am doing. I do not see the purpose of making that particular remark.

Mr. Bailey. The remark was made for the purpose of making it clear that in a case now pending on appeal, the trial court found that the order you inquire about was a perfectly valid, reasonable, and proper order. At this time we had been attempting to shut down this Jones field for some time. In other words, we had been talking about it in Commission meetings and in order to get results, but when it came to the time that we were threatened with this suit, it was the proper time to do it. It happened that at that time none of the producing companies could complain of losing the market for their oil, because no oil was being produced.

Mr. Wolverton (interposing). Let us look at the facts as they existed on August 16 when this action was taken.

I noticed in the papers at or about that time a news item carried by the Associated Press that one of the major oil companies had reduced its offered price for oil.

Mr. Bailey. That is true.

Mr. Wolverton. Thereupon the oil-producing States became greatly disturbed, and under the leadership of Colonel Thompson, action was taken. A meeting was held of the compact commission.

Mr. Bailey. Yes, sir.

Mr. Wolverton. Whether they took any action or not I am not certain. I am inclined to think if they did not take any action they must have had a gentlemen's agreement.

Mr. Bailey. The State of Arkansas——

Mr. WOLVERTON (continuing). Pardon me for just a minute until I get the facts before you, as I understand them, and then if there is any difference in your understanding and mine, let us see about it.

Then, after the interstate compact commission met, and disbanded, Colonel Thompson went back to Texas and the other representatives went back to their States and immediately the production of oil is stopped, and it was definitely stated that the production was stopped in order to control the price at which it was being sold. Is that the case or not?

Mr. BAILEY. If I remember——

Mr. WOLVERTON. The fact is that your State participated in that meeting? And while you have given as a reason here today a statement in which you say that you were sustained by the court, yet the facts stand out that your State and all of the others acted jointly at the same time to stop the production of oil.

Mr. BAILEY. If I remember the event correctly, I believe Texas and Kansas issued their shut-down orders prior to the convening of the Compact Commission at Oklahoma City.

Mr. WOLVERTON. Yes; I think that is probably true; but the whole thing happened so quickly that it was all one transaction. There were very few days' difference in the action taken by the several commissioners or their respective States. They were all acting together and it was on or about that date that you folks took your action, namely August 16.

Now, what I want to know is how it happened that all of the oil-producing States, with one exception that I am not sure about, at practically the same time, stopped the production of oil for a certain length of time.

Mr. BAILEY. Well, do you ask then if this shut-down was done for the purpose of causing the companies to raise the price of oil?

Mr. WOLVERTON. Yes.

Mr. BAILEY. And that was lifted after it?

Mr. WOLVERTON. Yes.

Mr. BAILEY. After attaining the desired results?

Mr. WOLVERTON. Yes.

Mr. BAILEY. In my State, our shut-down order contains a provision shutting down these various flush fields. We had what is known as a partial shut-down. Certain fields were not shut down. We had this litigation that delayed us in this matter and after the shut-down, on the 26th of August—our shut-down order was dated the 16th—the Commission held another hearing.

Now, we ordered our pools opened up, those in which we completed the tests, on the 27th. Some others were opened on the 1st of September, and there is one in which we had so much trouble it was not opened until the 4th of September, I believe, until we completed these tests.

We issued our order opening them up on the 26th of August and at that time none of the companies that had restored their posted prices, and we did not know that they were going to.

Mr. WOLVERTON. Mr. Bailey, although the oil legislation that has come before Congress during the last 5 years has been offered in the name of conservation, yet I could not close my eyes to the fact that it is also of great importance in stabilizing the oil industry.

The limitation of production of oil necessarily affects the price structure. And, when you affect the price structure you are affecting the consumer.

I am interested from that standpoint as well as from the standpoint of conserving a natural resource.

During our deliberations at different times over this period of 5 years, fear has frequently been expressed that by limitation of production of oil we might do harm to the consumer interests. In other words, when you interfere with the natural play of supply and demand and fix it, fictitiously, you thereby affect the price structure.

We made provision in the Connally Hot Oil Act for that very situation. We said that if it should appear that any advantage was being taken by the oil-producing States that then the President could withdraw the benefits of the Connally Hot Oil Act. That is the reason that was put in.

Last summer when many, if not all, of the oil-producing States had, at practically the same time, stopped production because one of the major oil companies had reduced its price, it seemed to give evidence that the fears we had previously expressed were justified and that the oil States were more interested in stabilizing the oil industry and keeping the price of oil up more than they were in the question of conservation, that they had dwelt so long upon and urged so strongly when they appeared before the committee.

That is the reason I am asking how it happened in your State that you determined to make this examination of the wells, issue your order with reference to it, a copy of which I have before me, and how it is that it so happened that it took place at the very time that all of the other States under one pretext or another were stopping the production of oil, and followed so closely on the posted price, the reduced price by that major oil company. This, together with the statements that were published in the paper quoting Colonel Thompson and others who are leaders in the industry, left no doubt in my mind that it was all done because of a desire to keep the price of oil up, and not because of the reasons that appear on the records of the several commissions.

Mr. Bailey. Mr. Congressman, I appreciate your interest in that. The question of controlling production and regulating price is something that should be of interest to this committee.

Mr. Wolverton. Did you participate in the State compact commission meeting?

Mr. Bailey. I attended the meeting at Oklahoma City. I did not participate in the discussion, because Arkansas does not belong to the compact.

Mr. Wolverton. You were present and heard the discussion?

Mr. Bailey. I was.

Mr. Wolverton. What was said about the major oil companies reducing the price and the necessity for the stoppage of production for a while?

Mr. Bailey. Well, I think Mr. Thompson should answer that question, or has answered it. He has been before you. In other words——

Mr. WOLVERTON. No; he offered a lot of reports, and said that he would present the minutes of the meeting, but he has not done it yet.

I asked him about it in New Orleans.

Mr. BAILEY. The only thing I can testify to, Mr. Wolverton, is to the State of Arkansas, because we have our own rules. We have our own law and we attempt to regulate our own affairs.

Mr. WOLVERTON. What was that meeting of the interstate compact commission called for?

Mr. BAILEY. It was to discuss the question I believe—I do not have a copy of the call before me—I do not know the reasons stated in the call. It was to discuss this.

Mr. WOLVERTON. The call did not say, "Let us just come together and have a meeting?"

Mr. BAILEY. No; not that. There was a discussion of the questions, because of the price situation.

Mr. WOLVERTON. You men do not leave your States and travel all of the way to Oklahoma City because somebody calls you there, do you? You know what you are going for.

Mr. BAILEY. Not necessarily. I have attended several meetings of the compact commission and sat in and listened to the discussions.

Mr. WOLVERTON. In other words, when they say come, you go, and you are not interested in what you are going for, but you want to go and see and hear what takes place?

Mr. BAILEY. Naturally, as one State producing oil, we are interested in what the other States are doing. We attend. At least, I have attended several of these meetings.

Mr. WOLVERTON. The notice told you what the purpose of the meeting was, or at least you considered it of sufficient importance to attend the meeting?

Mr. BAILEY. That is correct.

Mr. WOLVERTON. All right; who opened the meeting?

Mr. BAILEY. Mr. Thompson, the chairman.

Mr. WOLVERTON. What did he say when he opened the meeting?

Mr. BAILEY. He gave a statement, after the meeting was over, which is a matter of record, that each State handle its own affairs as it saw fit.

Mr. WOLVERTON. I am not asking what somebody reported afterward who may or may not have been in the meeting. I am asking you who was present. What did Colonel Thompson say?

Mr. BAILEY. I do not recall.

Mr. WOLVERTON. You do not remember?

Mr. BAILEY. No; I do not recall what he stated.

Mr. WOLVERTON. What was the subject matter?

Mr. BAILEY. The subject matter was the question of conservation, and the effects of this reduction in price.

Mr. WOLVERTON. Did he relate to the commission the situation that I have referred to?

Mr. BAILEY. I will state frankly, I do not know whether it was discussed at the time. If you reduce the price of oil to a certain point, why, it is going to affect the producers of the various States; affect the States themselves; their revenues are dependent upon oil and many of their communities' welfare is dependent upon the production of oil; but I think the record shows plainly here that during the past 10 years since we have had proration the price of gasoline has gone down to the consumer. And, the product has been made better. Our reserves are increasing, and frankly I do not see whether there is any difference if you have Federal regulation or State regulation, if you restrict the output of the wells, you may, upon the theory, affect the price.

Mr. WOLVERTON. Congress has been appealed to for its assistance in the passage of laws that will enable oil-producing States to make more effective their limitation of production laws, proration laws. I am trying to ascertain whether such States are taking advantage of the help that has been given to them by the Federal Government.

I think you will agree with me that the oil companies could not agree together to cut down production without fear of entering into a conspiracy that would or might be considered a violation of the antitrust law; but when the States permit them to do so or the Federal Government recognizes and supports them by legislation it probably makes them free to do so. Now, being free to do so, it is my desire to inquire whether they are taking advantage of the help that is given by the Federal Government, as was indicated in August last when, to stop a reduction in price, they all met together and said, "We will not produce until we accomplish something." Then, after that order had been in effect for a considerable time it was taken off, and they were permitted to go ahead and produce oil.

Mr. BAILEY. In the State of Arkansas, we certainly appreciate the aid of the various Federal agencies; but I have in mind particularly the Federal Tender Board. They cooperated with us in promulgating our orders for the tender system, and the States themselves have helped one another. When we started out in the State of Arkansas our old production had been of small importance for years.

Mr. WOLVERTON. Mr. Bailey, I do not believe you want to purposely avoid my questions or the answer that will be an actual statement of the facts.

The interstate compact commission was called together to consider this threat to the oil industry, created by one of the major oil companies by reducing its offered price; is that not true?

Mr. BAILEY. It was called immediately afterward; yes, sir.

Mr. WOLVERTON. And that threat to the price structure was brought to the attention of the commission by Colonel Thompson?

Mr. BAILEY. He was chairman of the compact commission at that time.

Mr. WOLVERTON. The other States, whose representatives were present, participated in that discussion; is that not true?

Mr. BAILEY. That is correct.

Mr. WOLVERTON. Was any action taken as the result of the discussion?

Mr. BAILEY. By the compact commission; no.

Mr. WOLVERTON. Was it agreed not to take any action but to leave it to the individual States?

Mr. BAILEY. That was the way I understood it.

Mr. WOLVERTON. So that the interstate compact commission without itself taking any action after discussion left it to the individual States, and each of the States went home, and immediately proceded to stop production; is that right?

Mr. BAILEY. As I understand the compact commission made no recommendations to the various States.

Mr. WOLVERTON. But the result of the meeting was that the representatives went home to their respective States and their States stopped production, did they not?

Mr. BAILEY. That happened; yes, sir.

Mr. WOLVERTON. Well, that is exactly what I thought was the case.

Now, what effect did that have on price?

Mr. BAILEY. The reduction in price was, I believe, a reduction of 20 cents a barrel.

Mr. WOLVERTON. So, it had the effect of driving back into line the major company which had reduced the price?

Mr. BAILEY. Well, I cannot testify as to the other States. In our State, Arkansas, we did not do anything to drive the major company back in line. We restored the production, revoked our shut-down orders, as fast as we completed these physical tests in the various fields. We issued our order restoring the field to production prior to any general increase in price and the commission at that time had no knowledge that the price would be restored. We did not know whether it would be or not. We completed the tests, which was for the purpose as announced in the order, and we reopened the fields to production.

Mr. WOLVERTON. What was the date of the meeting of the interstate compact commission?

Mr. BAILEY. I think the 14th or 15th of August.

Mr. WOLVERTON. The 13th or 14th of August?

Mr. BAILEY. Yes.

Mr. WOLVERTON. And you took your action on the 16th?

Mr. BAILEY. Approximately that time.

Mr. WOLVERTON. Just about time enough to get back home?

Mr. BAILEY. I came back home and reported to our commission which is composed of seven members, and I just happened to be one of the seven members. We act on the judgment of those seven members of our commission.

Mr. WOLVERTON. It is interesting to me that they acted so quickly. That is all.

Mr. COLE. All right; thank you, Mr. Bailey.

Mr. BAILEY. Do you wish any of these shut-down orders entered as a part of the record?

Mr. KELLY. Yes; you may enter them as a part of the record if you so desire.

(The exhibits above referred to, together with two of the shut-down orders above referred to, are as follows:)

EXHIBIT 2

ARKANSAS OIL AND GAS COMMISSION,
El Dorado, Ark., September 16, 1939.

Order No. 47-39.
In Re: Certificates of clearance to assure compliance with the rules and regulations of the Commission.

TENDER ORDER

Whereas, in subsection "K" of Section 11, Act 105 of the Acts of the State of Arkansas for the year 1939, the Arkansas Oil and Gas Commission is given authority to make, after hearing and notice, rules and regulations for the purpose of requiring, either generally or in or from particular areas, certificates of clearance or tenders in connection with the tranpsortation of oil or gas in this State; and

Whereas, in subsection "N" of Section 9 of said Act, the term "tender" is defined: " 'Tender' shall mean a permit or certificate of clearance for the transportation of oil, gas or products, approved and issued or registered under the authority of the Commission"; and

Whereas the Arkansas Oil and Gas Commission did, on the 26th day of August, 1939, after due notice, hold a hearing and from the evidence adduced at this hearing and from study by the Commission and its staff, find as fact the following:

1. That the requiring of tenders or certificates of clearance is necessary to effectuate the intent and purpose of Act 105.

2. That tenders or certificates of clearance are necessary to better enforce and prevent the violation of the rules and regulations of the Commission promulgated pursuant to the provisions of Act 105.

3. That the requiring of said tenders should not encompass the oil produced in the fields not operating under production control regulation in this State, EXCEPT where the oil produced from such fields is commingled with oil produced from fields operating under production control regulation.

4. That at this time tenders are not necessary for gas or products.

5. That it is necessary to provide for the keeping of records and making of reports in connection with these tenders.

THEREFORE, IT IS ORDERED by the Arkansas Oil and Gas Commission that effective October 1, 1939, until further ordered, the following rules and regulations shall govern the handling of oil produced in the State of Arkansas.

RULE I. The following reports hereinafter identified shall be and are required:

Form 7 (marked "Exhibit A") to certify that the producer has complied with the rules and regulations of the Commission, authorizing a gatherer of oil to connect to a given lease.

Form 7-A (marked "Exhibit B") to identify oil gathered from producer's leases in controlled fields during a current month and to identify oil gathered from producer's leases in uncontrolled fields when gatherer commingles such oil.

Form 7-B (marked "Exhibit C") to identify any transportation of oil produced from controlled fields or to identify transportation of oil which is made up of commingled oil.

Form 13, Revised (marked "Exhibit D") to combine a tender operation statement with the gatherer or pipe-line statement.

RULE II. Each and every producer of oil from controlled fields in the State of Arkansas is now required to execute Form 7, authorizing a gatherer (whether himself or someone else) to gather the oil from the properties of such producer. The producer's authorization on Form 7 shall bind the producer until cancelled by him. Form 7 is not required from producers in uncontrolled fields.

RULE III. (A) The report on Form 7-A shall be executued under oath by each gatherer of oil in each controlled field in Arkansas and shall be delivered to the authorized office of the Commission in duplicate. It is intended that Form 7-A shall constitute assurance by the gatherer that (1) not more than the unrun balance of allowable oil, and (2) the current month's legal allowable production which such gatherer is authorized to run from their connections in said field during the period of time indicated on said report will be run by gatherer, and that gatherer will run the oil from said connections in compliance with the laws of the State of Arkansas and the rules and regulations of the Commission adopted pursuant thereto. Under no condition shall a report on 7-A constitute authority for the gatherer filing such report to deliver the oil to any other person or company or remove same from gatherer's system.

(B) Said report on 7-A shall show (1) the month during which the oil is to be run (such month to begin at 7 A. M. on the first day of a calendar month and end

7 A. M. of the first day of the subsequent calendar month); (2) the schedule number and the total number of barrels of allowable oil shown allocated to gatherer on said proration schedule issued by the Commission; (3) the total tenderable unrun balance, which total must be supported by itemized list of leases; (4) and in cases where gatherer commingles oil from controlled and uncontrolled fields in gatherer's system and makes deliveries to refineries, other pipe lines, etc., from common stock, the forecasted amount of oil to be received from gatherer's connections in uncontrolled fields.

(C) The gatherer may file not earlier than 10 days prior to the beginning of a calendar month, a preliminary report on Form 7–A, covering the first half of such calendar month and giving for said period the information specified in subparagraph (B) of this rule, but using the allowable proration schedule in effect at the time said report is filed. In the event a gatherer thus files a report on Form 7–A in advance of the first of the month, he shall not later than the 15th day of the calendar month file a supplemental report on Form 7–A for the total allowable for the lease during such month as shown by the actual proration schedule less the amount of the allowable already used on preliminary 7–A.

(D) The gatherer may file before the end of the month an amended, or supplemental report on Form 7–A to cover corrections occasioned by changes in allowable, new completions, abandonments, and other like matters.

(E) The gatherer may file separate reports on Form 7–A to cover the balance of stocks shown by producer's authorization of the unrun balance of allowable oil actually produced.

(F) On or before the 10th of each calendar month during which oil is to be run from a lease, the gatherer shall file with the Commission at El Dorado, Arkansas, the said report on Form 7–A in two (2) duplicate originals, and thereupon, the Commission's Agent authorized for that purpose shall examine the same and shall mark the 7–A as registered together with the date of registration and signature of approval or disapproval, and place on each copy the Commission's serial number to identify the Form 7–A covering the gathering described in such report. One copy of Form 7–A shall be retained by the Commission and one copy shall be returned to the gatherer making the report.

(G) No oil shall be moved from any lease in a controlled field or pool unless in respect thereto Forms 7 and 7–A have been completely executed and filed with the authorized agent of the Commission; provided, however, that during the first ten (10) days of each calendar month preceding the filing of forecast report on Form 7–A by the gatherer named in the producer's authorization on Form 7 already filed, such gatherer may move from a lease into his gathering system its current allowable production, but no more.

RULE IV. Form 7–B is to be used for any transportation of oil legally produced from a controlled field within or from the State of Arkansas. The shipper shall be required to execute under oath four duplicate originals of the report on Form 7–B and to file same in the office of the Commission at El Dorado, Arkansas, where Commission's designated Agent shall examine same and shall place on each copy of said report the Commission's serial number and date of such registration and place thereon signature of approval or disapproval. The Commission shall retain two copies of said report and return two copies thereof to the shipper, one of which copies the shipper shall deliver to the transporter.

RULE V. A tender may be issued whether the destination or consignee of oil covered by the tender is known or unknown at the time of application, but no tender may be issued which names more than one initial transporter by pipe line or railroad.

The authorized agent of the Commission, when approving a tender on Form 7–B, shall indicate thereon the date same shall expire, which date of expiration shall not be later than the end of the calendar month during which the tender specifies the shipment will be made. It shall not be necessary for a registered and approved copy of a tender to accompany the shipment: *Provided, however,* That an initial transporter by railroad or pipe line carrying the oil described in the tender must receive a registered and approved copy of the tender before accepting any such oil for transportation.

RULE VI. Form 7–B must be supported by Form 7–A or page 1, Revised Form 13. No intermediate Form 7–B is required when gatherer is the transporter, transferring oil from gathering system to gatherer's pipe-line system.

RULE VII. Page 1, Form 13 Revised, is a combined pipe line and tender operations statement (Exhibit "D," attached). Said report shall be filed in the office of the Commission on or before the 15th of the calendar month following that covered by the report.

(a) All information requested on the report must be shown.

(b) Any pipe-line overage or excess oil shall be classed as frozen stock and may not be moved.

(c) In showing receipts from leases in uncontrolled fields where no tenders are required, show field name and actual receipts.

(d) Each Form 13, Page 1, so filed shall be registered and given a serial number, and after authorized agent of the Commission has checked and approved same, one copy will be returned to the operator and shall be used to support delivery tender, Form 7–B, against crude oil on hand.

IT IS FURTHER ORDERED that the above-mentioned rules become effective as of October 1, 1939, after which no oil produced from a controlled field may be gathered or delivered unless Form 7–A and 7–B have been approved, covering the gathering and delivery of said oil. Tenders for October should be made for all controlled oil to be run during the entire month of October 1939, but in order to enable the operators to have ample time to secure approved tenders, allowable oil may be run as in the past without tender until October 15, 1939, but Forms 7–A and 7–B should be prepared for the full thirty-day month, including the first fifteen (15) days.

ARKANSAS OIL AND GAS COMMISSION.
A. M. CROWELL, *Director.*

It is so ordered by the Commission.

O. C. BAILEY, *Chairman.*
J. D. REYNOLDS.
ED HOLLYFIELD.
ROBERT J. SHORT.
L. A. LONGINO.
BASIL HOAG.
EDWIN B. KEITH.

EXHIBIT Z

ARKANSAS OIL AND GAS COMMISSION,
El Dorado, Ark., March 31, 1939.

Order No. 12–39, Special Order.
In re Field rules for the lime pool of the Buckner Field

BUCKNER FIELD—LIME POOL

Pursuant to the provisions of Act No. 105 of the Fifty-second General Assembly of the State of Arkansas, approved February 20, 1939, and

Whereas the Commission, after due notice, has conducted public hearings including the hearing of March 27 and 28, 1939, at which all interested parties were given the opportunity to be heard, and

Whereas the Commission finds from the evidence adduced and from personal study and investigation that the following rules and regulations are necessary for the prevention of waste, and, therefore, are hereby adopted, effective this date and are in full force and effect until further notice.

RULE I. General: The rules and regulations of State-wide application, promulgated as Order No. 2–39, March 4, 1939, shall apply, when applicable, to the Lime Pool of the Buckner Field.

RULE II. Spacing: No well shall hereafter be drilled for oil or gas at any point less than 1,320 feet from any spudded, drilling, or completed well, or less than 660 feet from any property line or division line: *Provided,* That the Commission may grant such exceptions, after notice and upon hearing, as may be reasonably necessary where it is shown, and the Commission finds, that a well drilled in accordance with the stated spacing rule would be outside the pool or topographical conditions are such as to make drilling difficult. However, whenever an exception is granted, the Commission shall take such action as will offset any advantage which the person securing the exception may have over other producers by reason of the drilling of the well as an exception.

RULE III. Drilling Unit: Not more than one well shall be drilled on any forty acres, or forty acre subdivision of a lease, owned on the effective date of this order by one person, or by persons in moiety. To a well which is drilled upon such forty acre unit, the forty acres upon which it is drilled shall be assigned to that particular well. If, however, a well is drilled on a lease covering more than 40 acres, owned by one person, or by persons in moiety, the acreage in excess of 40 acres, but in no event more than 10 acres in excess of 40 acres, upon which such well is drilled, shall be used for the purpose of allocating production: *Provided*, That when two or more separately owned tracts of land are embraced within this established drilling unit, the owners thereof may validly agree to integrate their interests and to develop their lands as a drilling unit. Where, however, such owners have not agreed to integrate their interests, the Commission shall for the prevention of waste, or to avoid the drilling of unnecessary wells, require such owners to do so and to develop their lands as a drilling unit. All orders requiring such integration shall be made after notice and hearing, and shall be upon terms and conditions that are just and reasonable, and will afford to the owner of each tract the opportunity to recover or receive his just and equitable share of the oil and gas in the pool without unnecessary expense, and will prevent or minimize reasonably avoidable drainage from each developed unit which is not equalized by counter drainage. The portion of the production allocated to the owner of each tract included in a drilling unit formed by an integration order shall, when produced, be considered as if it had been produced from such tract by a well drilled thereon. In the event such integration is required, the operator designated by the Commission to develop and operate the integrated unit shall have the right to charge to each other interested owner the actual expenditures required for such purpose not in excess of what are reasonable, including a reasonable charge for supervision, and the operator shall have the right to receive the first production from the well drilled by him thereon, which otherwise would be delivered or paid to the other parties jointly interested in the drilling of the well, so that the amount due by each of them for his share of the expense of the drilling, equipping and operation of the well may be paid to the operator of the well out of production, with the value of the production calculated at the market price in the field at the time such production is received by the operator or placed to his credit. In the event of any dispute relative to such costs, the Commission shall determine the proper costs.

RULE IV. Casing Program: The casing program of all wells hereafter drilled to the Lime Pool in the Buckner Field shall be as follows, unless otherwise ordered:

(a) A minimum of 100 feet of surface casing shall be set and cemented with not less than fifty sacks of cement. Cementing shall be done by the pump-and-plug method. Cement shall be allowed to set a minimum of twenty-four hours.

(b) A second string of casing shall be set at a minimum depth of 2,200 feet, and shall be cemented with sufficient cement to fill the annular space back of the casing up into the surface casing, using not less than five hundred (500) sacks of cement. Cementing shall be done by the pump-and-plug method. Cement shall be allowed to set a minimum of twenty-four (24) hours under pressure before drilling the plug or initiating tests. Said second string of casing shall be new casing or reconditioned casing which has been tested to thirteen hundred (1,300) pounds per square inch pressure subject to reconditioning.

Before drilling the plug in the second string of casing the casing shall be tested by pump pressure in the presence of an offset operator or an agent of the Commission, or both. After the mud-laden fluid in the hole has been displaced by clear water, pump pressure of at least eight hundred (800) pounds per square inch shall be applied. If at the end of thirty minutes the pressure gauge shows a drop of one hundred fifty (150) pounds or more, the operator shall do that which is necessary to cause the second string of casing to be set and cemented so that it will hold said pressure for thirty (30) minutes without a drop of more than one hundred fifty (150) pounds in pressure.

(c) The producing string of casing shall consist of new casing, mill-tested to at least two thousand (2,000) pounds pressure per square inch, which shall be set below the gas oil contact of, or set completely through and perforated below the gas oil contact of the oil-saturated formation. Cementing shall be done by the pump-and-plug method. Said producing string shall be cemented with not less than five hundred sacks of cement, and shall be allowed to stand a minimum of twenty-four hours under the pressure required to pump the plug to bottom and a minimum total of seventy-two hours before drilling the plug and the casing.

Before drilling the plug in the producing string of casing, the casing shall be tested by pump pressure in the presence of an offset operator or an agent of the Commission, or both. After the mud-laden fluid in the hole has been displaced by clear water, a pump pressure of fifteen hundred (1,500) pounds per square inch shall be applied. If at the end of thirty minutes, the pressure gauge shows a drop of fifty pounds or more in pressure, the operator shall do that which is necessary to cause said string of casing to be so set and cemented that it will hold said pressure for thirty minutes without a drop of more than fifty pounds in pressure.

RULE V. Completion: Each operator shall notify the Commission in writing, at least twenty-four (24) hours before completing a well, the time at which said well will be completed. If said well be completed by the operator in conformity with the regulations of the Commission, a completion certificate shall be issued to such operator. Completion certificates shall be withheld until the well has been completed in accordance with the rules of the Commission. Pipe-line companies and all other purchasers or carriers are forbidden to accept oil or gas from any well until the completion of such well is approved by certificate of compliance.

RULE VI. Allocation of Production (Oil Wells): The total quantity of crude oil which may be lawfully produced each day from the Lime Pool of the Buckner Field, shall be determined by the Commission. The said total quantity of oil which may be lawfully produced daily from the Lime Pool is hereafter that amount as shown on the Commission's Schedule of Allowed Production.

RULE VII. Method of Allocation (Oil Wells): The daily allowable production of oil for individual wells in the Lime Pool of the Buckner Field shall be determined by multiplying the acreage containing the well (Rule III) by the bottom-hole pressure of the well (as determined by the Commission) and that by a factor. The factor shall be derived by dividing the field outlet by the acre-pounds in the field.

RULE VIII. Gas Limit: Any well producing with a gas oil ratio in excess of one thousand (1,000) cubic feet per barrel of oil produced shall be allowed to produce daily only a total volume of gas equivalent to the volume obtained by multiplying the daily oil allowable, as determined by Rule VII, of said well by 1,000 cubic feet. This amount of gas will be known as "Gas Limit" for oil wells; and if it be necessary to restrict the production of oil below that amount as shown on the current Schedule of Allowed Production in order to remain within the gas limit, this shall be done.

It is ordered that this docket be kept open to consider any claims of discrimination or hardship, and to offer administrative relief, if possible, and that the Commission is anxious to hear at public hearing, evidence pertaining to any peculiarities of any or all of the wells in the reservoir affected by this order.

ARKANSAS OIL AND GAS COMMISSION,
A. M. CROWELL, *Director*.

It is so ordered by the Commission:

O. C. BAILEY, *Chairman*,
J. D. REYNOLDS
ED HOLLYFIELD,
ROBERT J. SHORT,
L. A. LONGINO.

EXHIBIT 4

ARKANSAS OIL AND GAS COMMISSION,
El Dorado, Ark., January 22, 1940.

Order No. 3-40.

In re basic allowed production for February 1940 for the various fields & pools operating under production-control regulation in the State of Arkansas

BASIC ALLOCATION OF PRODUCTION, 7 A. M., FIRST OF FEBRUARY 1940, UNTIL FURTHER NOTICE

Whereas, after due notice, a hearing by the Arkansas Oil and Gas Commission was held in Magnolia, Arkansas, on December 18, 1939, with respect to the existence and imminence of waste of oil and gas in the State of Arkansas and the prevention thereof, as authorized and required by Act 105, passed by the 52nd General Assembly of the State of Arkansas, and

Whereas in view of the evidence, the Commission finds that waste as to oil and gas exists and is reasonably imminent in the State of Arkansas and that the following order is reasonably necessary to prevent such waste, as waste is defined in Act 105, and

Now, Therefore, it is Ordered that these basic schedules of allowable production, effective 7 A. M., February 1, 1940, be and the same are in full force and effect until further notice.

The daily allowable oil as scheduled herein represents the amount of oil that can be legally produced in any one day of 24 consecutive hours, from 7:00 a. m. one day to 7:00 a. m. the following day. Any oil produced in excess of these daily allowables is "illegal oil."

It is ordered that the allowable oil as scheduled herein is 100% net oil measured on 100% tank tables and corrected to 60 degrees Fahrenheit. All production, runs to storage and deliveries are to be based on 100% tank tables, with proper adjustments for temperature, B. S. and water, when reported to the Commission.

It is further ordered that this docket be kept open to consider any claims of discrimination or hardship and to offer administrative relief, if possible, and that the Commission is anxious to hear at public hearing, evidence pertaining to any peculiarities of any or all of the wells in the reservoirs affected by this order.

ARKANSAS OIL AND GAS COMMISSION,
A. M. CROWELL, *Director.*

It is so ordered by the Commission:

O. C. BAILEY, *Chairman.*
J. D. REYNOLDS,
ED HOLLYFIELD,
ROBERT J. SHORT,
L. A. LONGINO,
BASIL HOAG,
EDWIN B. KEITH.

Schedule of allowable production, effective 7 a. m., Feb. 1, 1940

INDEX

Field	Pool	Daily allowable	Page
		Barrels	
Atlanta	Lime	900	1
Buckner	do	2,679	2
Dorcheat	do	1,200	1
Magnolia	do	18,907	3
Schuler	Sand	15,000	7
Do	Lime	2,801	13
Village	do	1,493	15
Total controlled fields		42,980	
Total settled fields		27,020	
State allowable		70,000	

KEY TO ABBREVIATIONS

B. H. P	Bottom-hole pressure in pounds per square inch.
G. O. R	Gas/oil ratio in cubic feet.
M A. P	Thousand acre-pounds pressure.
P. S. I	Pounds per square inch.
*	Excessive gas/oil ratio.
**	Incapable of producing allowable.

SCHEDULE No. 104.—*Atlanta Field "Big Lime", February 1940*

[Total thousand acre-pounds, 786.8; total field allocation, 900 barrels]

Company and lease	Well No.	Acreage	B.H.P.	Thousand acre-lbs.	G.O.R.	Allowable		Pipe-line connection
						Daily	Monthly	
Hunt, Hassie: McWilliams, H. A.	1	40	2,810	112.4	950	150	4,350	Lion Oil Refining Co.
Lion Oil Refining Co.: Tissue.	1	40	2,810	112.4	700	150	4,350	Do.
Mahony, Joe K. et al.: Emma Riley.	1	40	2,810	112.4	850	150	4,350	Do.
Tide Water Associated—Seaboard:								
Beene, J. T	1	40	2,810	112.4	1,660	150	4,350	Tide Water Associated—Seaboard.
Clark, W. H	1	40	2,810	112.4	700	150	4,350	Do.
Price, J. A	1	40	2,810	112.4	954	150	4,350	Do.
Total	6	240		786.8		900	26,100	

Allocated to pipe lines	Daily	Monthly
Lion Oil Refining Co.	450	13,050
Tide Water Associated—Seaboard	450	13,050
Total	900	26,100

SCHEDULE No. 704.—*Dorcheat Field "Lime Pool", February 1940*

[Total field allocation, 1,200]

Company and lease	Well No.	Acreage	B.H.P.	Thousand acre-lbs.	G.O.R.	Allowable		Pipe-line connection
						Daily	Monthly	
Atlantic Refining Co.:								
Pinewoods Lumber Co.	1	40				300	8,700	Lion Oil Refining Co.
Do	B-1	40				300	8,700	Do.
Lion Oil Refining Co.: Warnock, R. S.	1	40				300	8,700	Do.
Superior Oil Co.: Martel, C. W.	1	40				300	8,700	Do.
Total	4	160				1,200	34,800	

Allocated to pipe lines	Daily	Monthly
Lion Oil Refining Co	1,200	34,800

The above allowable oil is 100 percent net oil corrected to 60° F. measured on 100 percent tank tables.

SCHEDULE NO. 204.—*Buckner Field, Big Lime, February 1940*

[Total field M acre-pounds, 2,162.0; total field allocation, 2,679; M acre-pound factor—M acre-pounds=1.310455]

Company and lease	Well No.	Acreage	B. H. P.	Thousand acre-pounds	G. O. R.	Allowable		Pipe-line connection
						Daily	Monthly	
Standard Oil Co. of Louisiana:								
Crone, S. T	1	40	2,790	111.6	218	146	4,234	Standard Oil Co.
Do	2	40	2,765	110.6	218	145	4,205	Do.
Do	3	40	2,800	112.0	202	147	4,263	Do.
Do	4	40	2,800	112.0	208	147	4,263	Do.
Eddy et al., H. B	1	40	2,945	117.8	172	154	4,466	Do.
Do	2	40	2,975	119.0	172	156	4,524	Do.
Foster, Allen	1	40	2,940	117.6	175	154	4,466	Do.
Johnson, Nancy, et al.	1	40	2,860	114.4	291	150	4,350	Do.
Do	B-1	40	2,860	114.4	174	150	4,350	Do.
McKean, J. P	1	40	2,770	110.8	206	145	4,205	Do.
Do	2	40	2,860	114.4	180	150	4,350	Do.
Do	3	40	2,880	115.2	206	151	4,379	Do.
Do	4	40	2,820	112.8	206	148	4,292	Do.
Do	5	40	2,860	114.4	180	150	4,350	Do.
Do	6	40	2,890	115.6	180	151	4,379	Do.
Warren, J. L	1	40	2,760	**110.4	275	**65	1,885	Do.
Do	2	40	2,700	**108.0	275	**67	1,943	Do.
Waters, J	1	40	2,825	113.0	193	148	4,292	Do.
Do	2	40	2,950	118.0	160	155	4,495	Do.
Total	19	760		2,162.0		2,679	77,691	

Allocated to pipe lines	Daily	Monthly
Standard Oil Co. of Louisiana	2,679	77,691

The above allowable oil is 100 percent net oil corrected to 60° F. measured on 100-percent tank tables.

SCHEDULE NO. 304.—*Magnolia Field, Big Lime, February, 1940*

[Total M acre-pounds, 11,343.1; total field allocation, 18,907; M acre-pound factor—M acre-pounds=1.66559

Company and lease	Well No.	Acreage	B. H. P.	Thousand acre-pounds	G. O. R.	Allowable		Pipe-line connection
						Daily	Monthly	
Alice Sidney Oil Co.: Crisp.	1	40.00	3,365	134.6		224	6,496	Columbia Pipe Line Co.
Arkansas Fuel Oil Co.:								
Glasgow-Crisp	1	40.00	3,370	134.8	814	225	6,525	Arkansas Fuel Oil Co.
Glasgow, Daisy	1	40.00	3,370	134.8	885	225	6,525	Do.
King, Willie	A-1	40.00	3,370	134.8		225	6,525	Do.
Do	B-1	40.00	3,370	134.8		225	6,525	Do.
Do	B-2	40.00	3,370	134.8		225	6,525	Do.
Atlantic Refining Co.:								
Barnett, F	B-1	40.00	3,360	134.4	890	224	6,496	Standard Oil Co, of Louisiana.
Barnett, J. M	A-1	40.00	3,355	134.2	730	224	6,496	Do.
Brown	1	40.00	3,355	134.2	920	224	6,496	Do.
Crisp	1	40.00	3,355	134.2	720	224	6,496	Do.
Foster	1	40.00	3,365	134.6	1,250	224	6,496	Do.
Do	2	40.00	3,365	134.6	940	224	6,496	Do.
Garrett, L	A-1	40.00	3,355	134.2	740	224	6,496	Do.
Do	B-1	40.00	3,360	134.4	850	224	6,496	Do.
Do	C-1	40.00	3,360	134.4	870	224	6,496	Do.
Do	D-1	40.00	3,365	134.6	1,210	224	6,496	Do.
Do	E-1	40.00	3,365	134.6	750	224	6,496	Do.
Spain, Luel	1	35.24	3,365	118.6	940	198	5,742	Do.
Do	2	40.00	3,365	134.6	1,000	224	6,496	Do.
Goldston, W. L.: Garrett, A. C.	1	40.00	3,360	134.4	812	224	6,496	Columbia Pipe Line Co.
Hunt, Hassie: Talley	1	40.00	3,370	134.8	848	225	6,525	Standard Oil Co.

SCHEDULE NO. 304.—*Magnolia Field, Big Lime, February, 1940*—Continued

Company and lease	Well No.	Acreage	B. H. P.	Thousand acre-pounds	G. O. R.	Allowable		Pipe-line connection
						Daily	Monthly	
Lion Oil Refining Co.:								
Garrett	1	40.00	3,365	134.6		224	6,496	Lion Oil Refining Co.
Glasgow	1	40.00	3,370	134.8	913	225	6,526	Do.
Do	2	40.00	3,370	131.8	914	225	6,525	Do.
Marine Oil Co.: Jones	1	40.00	3,370	134.8		225	6,525	Standard Oil Co.
Mid-Continent Petroleum Corporation: Foster, R. S.	1	40.00	3,365	134.6		224	6,496	Do.
Normandie Oil Corporation:								
Dees, Jap	1	40.00	3,350	134.0		223	6,467	Columbia Pipe Line Co.
Do	2	42.00	3,350	140.7		234	6,786	Do.
Garrett, L	1	40.00	3,360	134.4	864	224	6,496	Do.
Do	B-1	40.00	3,360	134.4	850	224	6,496	Do.
Oliphant Oil Corporation: Jones.	1	40.00	3,375	135.0		225	6,525	Standard Oil Co.
Petroleum Finance Corporation: Barnett, Mrs. Frank.	1	40.00	3,365	134.6	941	224	6,496	Columbia Pipe Line Co.
Phillips Petroleum Co.:								
Joiner	1	40.00	3,365	134.6	720	224	6,496	Lion Oil Refining Co.
Joiner Unit	1	40.00	3,365	134.6		224	6,496	Do.
Longino	1	40.00	3,365	134.6	830	224	6,496	Do.
Do	2	40.00	3,370	134.8	790	225	6,525	Do.
Walthall	1	40.00	3,365	134.6	735	224	6,496	Lion Oil Refining Co.
Do	2	40.00	3,370	134.8	715	225	6,525	Do.
Placid Oil Co.:								
Couch	1	34.73	3,365	116.9	964	195	5,655	Standard Oil Co.
Do	2	40.00	3,370	134.8	977	225	6,525	Do.
Shell Oil Co., Inc.:								
Garrett, L	1	40.00	3,360	134.4	937	224	6,496	Shell Oil Co.
Do	2	40.00	3,365	134.6		224	6,496	Do.
Glasgow	1	40.00	3,350	134.0	798	223	6,467	Do.
Do	2	40.00	3,360	134.4	798	224	6,496	Do.
Lewis, D. H	1	40.00	3,370	134.8		225	6,525	Standard Oil Co.
Merritt, W. F	1	40.00	3,370	134.8		225	6,525	Shell Oil Co.
Do	2	40.00	3,370	134.8		225	6,525	Do.
Peoples Bank of Columbia	1	40.00	3,370	134.8	1,346	225	6,525	Do.
Southwood Oil Co., Inc.:								
Foster	1	40.00	3,360	134.4	839	224	6,496	Columbia Pipe Line Co.
Do	2	40.90	3,355	134.2		224	6,496	Do.
Garrett, L	1	40.00	3,360	134.4	794	224	6,496	Do.
Do	B-1	40.00	3,365	134.6	853	224	6,496	Do.
Glasgow, Daisy	1	40.00	3,355	134.2		224	6,496	Do.
Grelling	1	40.00	3,340	133.6	951	223	6,467	Do.
Do	2	40.00	3,360	134.4	951	224	6,496	Do.
Hutcheson, J. O	1	40.00	3,370	131.8	931	225	6,525	Do.
Do	2	40.00	3,355	134.2	931	224	6,496	Do.
Johnson, James	A-1	40.00	3,365	134.6		224	6,496	Do.
Do	B-1	40.00	3,375	135.0		225	6,525	Do.
Kitchens, W. H	1	40.00	3,370	67.4		112	3,248	Do.
Simmons	1	40.00	3,370	134.8		225	6,525	Do.
Do	2	40.00	3,389	135.2		225	6,525	Do.
Walthall	1	40.00	3,375	135.0		225	6,525	Do.
Do	2	40.00	3,370	134.8		225	6,525	Do.
Standard Oil Co. of Louisiana:								
Booth	1	40.00	3,360	134.4		224	6,496	Standard Oil Co.
Foster Unit	1	34.72	3,360	116.7		194	5,626	Do.
Gunnels, T. J	1	40.00	3,365	134.6		224	6,496	Do.
Do	B-1	34.52	3,350	115.6		193	5,597	Do.
Lewis, D. H	1	40.00	3,380	135.2		225	6,525	Do.
Do	B-1	40.00	3,375	135.0		225	6,525	Do.
Longino, L. A	1	40.00	3,350	134.0		223	6,467	Do.
Merritt, W. F., et al	1	40.00	3,370	134.8		225	6,525	Do.
Do	B-1	40.00	3,370	134.8		225	6,525	Do.

SCHEDULE NO. 304.—*Magnolia Field, Big Lime, February, 1940*—Continued

Company and lease	Well No.	Acreage	B. H. P.	Thousand acre-pounds	G. O. R.	Allowable		Pipe-line connection
						Daily	Monthly	
Vanghn, G. H.:								
Baker	1	40. 00	3, 365	134. 6	848	224	6, 496	Dixie Pipe Line Co.
Do	2	40. 00	3, 370	134. 8	848	225	6, 525	Do.
Baker Unit	1	40. 00	3, 355	134. 2	570	224	6, 496	Do.
Crisp	1	40. 00	3, 360	134. 4	651	224	6, 496	Do.
Garrett, L	1	40. 00	3, 360	134. 4	895	224	6, 496	Do.
Garrett, N	1	50. 00	3, 360	168. 0	952	280	8, 120	Do.
Jones	A-1	40. 00	3, 380	135. 2	914	225	6, 525	Do.
Do	A-2	40. 00	3, 375	135. 0	914	225	6, 525	Do.
Do	B-1	40. 00	3, 375	135. 0		225	6, 525	Do.
Do	C-1	40. 00	3, 370	134. 8		225	6, 525	Do.
Jones Unit	1	40. 00	3, 375	135. 0		225	6, 525	Do.
Paschall	1	40. 00	3, 365	134. 6		224	6, 496	Do.
Total	85	3, 371. 21		11, 343. 1		18, 907	548, 303	

Allocated to pipe lines	Daily	Monthly
Arkansas Fuel Oil Co	1, 125	32. 625
Columbia Pipe Line Co	5, 054	146, 566
Dixie Pipe Line Co	2, 750	79, 750
Lion Oil Refining Co	2. 020	58. 580
Shell Oil Co., Inc	1, 570	45, 530
Standard Oil Co. of Louisiana	6, 388	185, 252
Total	18, 907	548, 303

The above allowable oil is 100 percent net oil corrected to 60° F. measured on 100-percent tank tables.

SCHEDULE NO. 404.—*Schuler Field "Jones Sand," February 1940*

[Total M acre-pounds, 6,679.9; total field allocation, 15,000 barrels; M acre-pound factor—M acre-pounds= 2.259216]

Company and lease	Well No.	Acreage	B. H. P.	Acre-pounds	G. O. R.	Suggested flowing time	Allowable		Pipe-line connection
							Daily	Monthly	
Alice Sidney Oil Co.:									
Morgan	2	20. 00	2, 330	46. 6	1. 053	24	105	3, 045	Root Petroleum Co.
Do	3	20. 00	2, 360	47. 2	1, 111	24	107	3, 103	Do.
Powledge	1	22. 00	2, 410	53. 0	775	24	120	3, 480	Do.
Do	2	20. 00	2, 420	48. 4	833	24	109	3, 161	Do.
Do	3	20. 00	2, 405	48. 1	1, 176	24	109	3, 161	Do.
Do	4	20. 00	2, 430	48. 6	1, 117	(1)	110	3, 190	Do.
Atlantic Refining Co.:									
Dnmas	1	20 00	1, 860	37. 2	1. 230	24	84	2, 436	Do.
Do	2	20. 00	1, 855	37. 1	553	(1)	84	2, 436	Do.
Rodgers	1	20. 00	2, 010	40. 2	837	24	91	2, 639	Do.
Bailey & Trimble: Powledge.	1	20. 00	2, 445	48. 9	2, 000	24	110	3. 190	Lion Oil Refrigerating Co.
Creseent Drilling Co.: Lena Lewis.	1	20. 00	1. 875	37. 5	848	24	85	2, 465	Standish Pipe-Line Co.
Delta Drilling Co.: Powledge.	1	20. 00	1. 940	38. 8	1, 910	24	88	2. 552	Lion Oil Refining Co.
Jones, Edwin M.:									
Marine	1	20. 00	2, 125	42. 5	1, 255	24	96	2. 784	Do.
Do	2	20. 00	2, 135	42. 7	1, 825	4	96	2. 784	Do.
Do	3	20. 00	2, 085	41. 7	624	1½	94	2, 726	Do.
Do	4	20. 00	2, 080	41. 6	1, 791	2½	94	2, 726	Do.
Murphy Id. Co	A-1	20. 00	2, 289	45. 8	1, 591	4	103	2, 987	Root Petroleum Co.
Do	A-2	20. 00	2, 210	44. 2	1, 612	24	100	2, 900	Do.
Do	A-3	20. 00	2, 145	42. 9	1, 314	24	97	2, 813	Do.
Do	B-1	20. 00	2, 465	49. 3	1, 500	24	111	3, 219	Lion Oil Refining Co.
Do	B-2	20. 00	2, 465	49. 3	1, 639	24	111	3, 219	Do.
Do	C-1	20. 00	2, 430	48. 6	714	(1)	**80	2, 320	Root Petroleum Co.

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[1] Piping.

SCHEDULE NO. 404.—*Schuler Field "Jones Sand," February 1940*—Continued

Company and lease	Well No.	Acreage	B. H. P.	Acre-pounds	G. O. R.	Suggested flowing time	Allowable		Pipe-line connection
							Daily	Monthly	
Jones, Edwin M.—Continued.									
Rodgers	1	20.00	1,940	38.8	1,632	4	88	2,552	Root Petroleum Co.
Do	2	20.00	2,005	40.1	1,353	2	91	2,639	Do.
Gallagher	1	30.00	2,393	71.8	882	24	162	4,698	Lion Oil Refining Co.
Morgan	1	20.00	2,470	49.4	858	24	112	3,248	Do.
Do	2	20.00	2,480	49.6	858	24	112	3,248	Do.
Do	3	20.00	2,470	49.4	914	24	112	3,248	Do.
Do	4	20.00	2,480	49.6	952	24	112	3,248	Do.
Lion Oil Refining Co.:									
Bank	1	20.00	2,480	49.6	1,482	------	112	3,248	Do.
Do	2	20.00	2,480	49.6	1,710	------	112	3,248	Do.
Do	3	20.00	2,480	49.6	1,815	------	112	3,248	Do.
Bessie	1	27.00	2,470	66.7	645	------	151	4,379	Do.
Calloway	1	20.00	2,465	49.3	705	------	111	3,219	Do.
Do	2	20.00	2,465	49.3	------	------	111	3,219	Do.
Cecil	1	20.00	2,450	49.0	568	------	111	3,219	Do.
Clay	1	20.00	2,480	49.6	893	------	112	3,248	Do.
Do	2	20.00	2,485	49.7	268	------	112	3,248	Do.
Do	3	20.00	2,480	49.6	528	------	112	3,248	Do.
Clarence	1	23.50	2,425	57.0	1,690	------	129	3,741	Do.
Do	2	23.80	2,440	58.1	1,225	------	131	3,799	Do.
Dee	1	20.00	2,325	46.5	1,156	------	105	3,045	Do.
Do	2	20.00	2,305	46.1	900	------	104	3,016	Do.
Do	3	20.00	2,360	47.2	1,150	------	107	3,103	Do.
Edna	1	28.03	2,105	67.4	670	------	152	4,408	Do.
Do	2	20.00	2,395	47.9	600	------	108	3,132	Do.
Do	3	20.00	2,385	47.7	875	------	108	3,132	Do.
Frank	1	20.00	2,485	49.7	528	------	112	3,248	Do.
Henry	1	20.00	2,480	49.6	913	------	112	3,248	Do.
Do	2	20.00	2,480	49.6	1,400	------	112	3,248	Do.
John	1	20.00	2,480	49.6	591	------	112	3,248	Do.
Justiss	A-1	20.00	2,295	45.9	1,930	------	104	3,016	Do.
Do	A-2	20.70	2,260	46.8	1,180	------	106	3,074	Do.
Marine	1	20.00	2,180	43.6	2,090	------	*95	2,755	Do.
Do	2	20.00	2,050	41.0	1,915	------	93	2,697	Do.
Do	3	20.00	2,205	44.1	1,475	------	100	2,900	Do.
Do	4	20.00	2,030	40.6	1,590	------	92	2,668	Do.
Do	5	20.00	2,055	41.1	660	------	93	2,697	Do.
Do	6	20.00	2,130	42.6	460	------	96	2,784	Do.
Marcus	1	20.00	2,435	48.7	1,620	------	110	3,190	Do.
Do	2	20.00	2,415	48.3	1,600	------	109	3,161	Do.
Do	3	20.00	2,445	48.9	1,260	------	110	3,190	Do.
Do	4	21.03	2,440	51.3	1,570	------	116	3,364	Do.
Marvin	1	16.50	2,430	40.1	990	------	91	2,639	Do.
Do	2	14.97	2,435	36.5	484	------	82	2,378	Do.
Mayfield	1	20.00	2,440	48.8	900	------	110	3,190	Do.
Do	2	20.00	2,435	48.7	1,150	------	110	3,190	Do.
Do	3	20.00	2,220	48.4	800	------	109	3,161	Do.
Do	5	20.00	2,430	48.6	915	------	110	3,190	Do.
Do	6	22.53	2,455	55.3	1,680	------	125	3,625	Do.
Miller	1	13.61	2,405	32.7	535	------	74	2,146	Do.
Morgan	A-4	20.00	2,390	47.8	1,875	------	108	3,132	50 percent Lion, 50 percent Standish.
Do	A-5	20.00	2,380	47.6	1,915	------	108	3,132	Do.
Do	A-6	20.00	2,385	47.7	1,930	------	108	3,132	Do.
Do	A-7	20.00	2,355	47.1	1,620	------	196	3,074	Do.
Do	B-3	20.00	2,385	47.7	1,910	------	108	3,132	Lion Oil Refining Co.
Do	B-4	20.00	2,365	47.3	1,570	------	107	3,103	Do.
Do	B-5	20.00	2,325	46.5	1,645	------	105	3,045	Do.
Do	B-6	20.00	2,385	47.7	1,785	------	108	3,132	Do.
Do	C-1	20.00	2,310	46.2	1,890	------	104	3,016	75 percent Lion. 25 percent Standish.
Do	C-2	20.00	2,305	46.1	1,960	------	104	3,016	Do.
Murphy Ld. Co.	1	20.00	2,480	49.6	1,110	------	112	3,248	Lion Oil Refin g Co.
Nelson	1	20.00	2,390	47.8	1,166	------	108	3,132	Do.
Do	2	20.00	2,400	48.0	1,740	------	108	3,132	Do.
Do	3	20.00	2,385	47.7	1,105	------	108	3,132	Do.
Do	4	20.00	2,390	47.8	1,000	------	108	3,132	Do.
National	1	20.00	2,273	45.5	1,700	------	103	2,987	Do.
Powledge	1	20.00	2,445	48.9	1,750	------	110	3,190	Do.
Sewell	1	28.18	2,465	69.5	388	------	157	4,553	Do
Do	2	20.00	2,480	49.6	962	------	112	3,248	Do

SCHEDULE NO. 404.—*Schuler Field "Jones Sand," February 1940*—Continued

Company and lease	Well No.	Acreage	B. H. P.	Acre-pounds	G. O. R.	Suggested flowing time	Allowable		Pipe-line connection
							Daily	Monthly	
Marine Oil Co.:									
Justiss	2	20.00	2,400	48.0	1,261	4	108	3,132	Root Petroleum Co.
Do	3	20.00	2,405	48.1	1,296	5	109	3,161	Do.
Fee	3	20.00	2,320	46.4	1,969	6	105	3,045	Lion Oil Refining Co.
Do	4	20.00	2,290	45.8	2,032	5	101	2,929	Do.
Do	5	20.00	2,240	44.8	1,730	8	101	2,929	Do.
Do	6	20.00	2,315	46.3	1,560	14	105	3,045	Do.
Do	7	20.00	1,980	39.6	1,584	24	89	2,581	Do.
Miller	1	20.00	2,410	48.2	1,000	24	109	3,161	Root Petroleum Co.
Calloway	1	28.35	2,465	69.9	2,019	11	*157	4,553	Lion Oil Refining Co.
Do	2	20.00	2,465	49.3	1,731	5½	111	3,219	Do.
Mahony, Joe K., et al.:									
Murphy Fee	1	20.00	2,465	49.3	1,327	24	111	3,219	Root Petroleum Co.
Do	2	20.00	2,470	49.4	1,203	24	112	3,248	Do.
Philips Petroleum Co.:									
Amanda	1	20.00	2,480	49.6	1,265	8	112	3,248	Standish Pipe Line Co.
Do	2	20.00	2,480	49.6	1,460	24	112	3,248	Do.
Brian	1	20.00	2,465	49.3	785	24	111	3,219	Do.
Do	2	20.00	2,465	49.3	852	8	111	3,219	Do.
Do	3	20.00	2,465	49.3	880	24	111	3,219	Do.
Edwards	1	(1)	--------	--------	--------	-------	33	957	Do.
El Dorado	1	20.00	2,480	49.6	1,240	8	112	3,248	Do.
Do	2	20.00	2,485	49.7	870	24	112	3,248	Do.
First National Bank	1	20.00	2,200	44.0	1,110	24	99	2,871	Do.
Gan	1	20.00	2,385	47.7	1,295	24	108	3,132	Do.
Do	2	20.00	2,385	47.7	582	24	108	3,132	Do.
Goodwin	2	20.00	2,325	46.5	960	8	105	3,045	Do.
Jennings	1	13.30	2,395	31.9	2,060	9	70	2,030	Do.
Justiss	2	20.00	2,410	48.2	1,065	24	109	3,161	Do.
Do	4	20.00	2,430	48.6	705	24	110	3,190	Do.
Marks	2	20.00	2,405	48.1	2,260	24	*96	2,784	Do.
Do	4	20.00	2,405	48.1	1,880	24	109	3,161	Do.
Marine	1	20.00	2,070	41.4	2,020	8	*93	2,697	Do.
Do	2	20.00	2,030	40.6	1,822	24	92	2,668	Do.
Do	3	20.00	2,180	43.6	1,150	8	99	2,871	Do.
Do	4	20.00	2,175	43.5	1,655	24	98	2,842	Do.
Do	5	20.00	2,230	44.6	2,560	8	*79	2,291	Do.
Mill	1	19.34	2,445	47.3	910	24	107	3,103	Do.
Miller	1	19.34	2,465	47.7	1,240	10	108	3,132	Do.
Milling	1	19.34	2,415	46.7	830	24	106	3,074	Do.
Murphy, C. H	1	20.00	2,355	47.1	970	24	106	3,074	Do.
Nelson	1	20.00	2,375	47.5	796	10	107	3,103	Do.
Rosen	2	27.00	2,385	64.4	1,400	8	146	4,234	Do.
Sewell	1	20.00	2,465	49.3	2,125	8	104	3,016	Do.
Do	2	20.00	2,465	49.3	2,480	8	*90	2,610	Do.
Do	3	20.00	2,455	49.1	856	8	111	3,219	Do.
Do	4	17.89	2,470	44.2	2,550	8	*78	2,262	Do.
Do	6	20.00	2,465	49.3	895	24	111	3,219	Do.
Do	7	17.89	2,470	44.2	1,500	24	100	2,900	Do.
Do	8	17.89	2,465	44.1	600	24	100	2,900	Do.
Do	9	29.33	2,470	72.4	1,505	8	164	4,756	Do.
Roberts & Murphy:									
Leona	1	20.00	2,435	48.7	1,826	5½	110	3,190	Root Petroleum Co.
Do	2	20.00	2,445	48.9	967	24	110	3,190	Do.
Texas Canadian Oil Corporation: Powledge.	1	20.00	1,915	38.3	1,490	24	87	2,523	Do.
Total	141	2,841.52	--------	6,679.9	--------	-------	15,000	435,000	

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[1] Pumping.

SCHEDULE NO. 404.—*Schuler Field "Jones Sand," February 1940*—Continued

Allocated to pipe lines	Daily	Monthly
Lion Oil Refining Co	8, 587	249, 023
Root Petroleum Co	2, 334	67, 686
Standish Pipe Line Co	4, 079	118, 291
Total	15, 000	435, 000

The above allowable oil is 100 percent net oil corrected to 60° F. measured on 100 percent tank tables.

SCHEDULE NO. 504.—*Schuler Field, "Reynolds Lime," February 1940*

[Total M acre-pounds, 2,232.4; total field allocation, 2,801; M acre-pound factor, M acre-pounds=1.254255]

Company and Lease	Well No.	Acreage	B.H.P.	Thousand acre-pounds	G.O.R.	Allowable		Pipe-line connection
						Daily	Monthly	
Jones, Edwin M.: Murphy Ld. Co.	B-3	40.00	3, 425	137.0	1, 300	172	4, 988	Root Petroleum Co.
Lion Oil Refining Co.:								
Marcus	5	40.00	3, 455	138.2	1, 360	173	5, 017	Lion Oil Refining Co.
Do	6	41.03	3, 455	141.8	955	178	5, 162	Do.
Mayfield	4	40.00	3, 460	138.4	1, 130	174	5, 046	Do.
Do	7	40.00	3, 460	138.4	861	174	5, 046	Do.
Morgan	A-1	40.00	3, 440	137.6	1, 955	173	5, 017	50 percent Lion, 50 percent Root.
Sewell	3	48.40	3, 450	167.0	1, 110	209	6, 061	Lion Oil Refining Co.
Marine Oil Co.:								
Calloway	3	48.50	3, 440	166.8	1, 125	209	6, 061	Root Petroleum Co.
Justiss	4	40.00	3, 440	137.6	838	173	5, 017	Do.
Phillips Petroleum Co.:								
Brian	4	40.00	3, 450	138.0	740	173	5, 017	Do.
Justiss	3	40.00	3, 450	138.0	690	173	5, 017	Do.
Marks	3	40.00	3, 450	138.0	610	173	5, 017	Do.
Miller	2	29.01	3, 455	100.2	760	126	3, 654	Do.
Sewell	5	40.00	3, 465	138.6	715	174	5, 046	Do.
Do	10	40.00	3, 465	138.6	690	174	5, 046	Do.
Roberts & Murphy: Leona	3	40.00	3, 455	138.2	613	173	4, 321	Do.
Total	16	696.94		2, 232.4		2, 801	81, 229	

Allocated to pipe lines	Daily	Monthly
Lion Oil Refining Co	994.5	28, 840.5
Root Petroleum Co	1, 806.5	52, 388.5
Total	2, 801.0	81, 229.0

The above allowable oil is 100-percent net oil corrected to 60° F. measured on 100-percent tank tables.

SCHEDULE No. 604.—*Village Field, Big Lime, February 1940*

The following schedule of oil allowables is based on volumetric control for these wells with ratios over 2,500 cubic feet per barrel. Wells with ratios under 2,500 are hereby given a daily allowable of 200 barrels:

Allowable=(ARV)÷(RV)
ARV=Allowed reservoir voidage
RV =Gas Oil Ratio Voidage

$$\text{ARV}=200+\left(\frac{200\times2500}{1276.15}\right)=591.8\text{ barrels}$$

RV =(Well ratio÷1276.15)+1

NOTE.—Figures based on average reservoir pressure of 3,338 P. S. I.

Total field allowable, 1,493

Company and lease	Well No.	Acreage	Daily allowed reservoir voidage	G.O.R.	Daily ratio voidage	Daily allowable	Monthly allowable	Pipe-line connection
			Barrels		*Bbls./bbl.*			
Fohs Oil Co.: Phillips, W. P.	1	40	591.8	13,000	11.2	53	1,537	Standard Oil Co.
McAlester Fuel Co.: Harris, E. D., et al.	1	40	202.0	601		200	5,800	Do.
Standard Oil Co. of Louisiana:								
Crumpler, Tena	1	40	591.8	10,975	9.6	62	1,798	Do.
Harris, E. D	1	40	591.8	6,547	6.1	97	2,813	Do.
Do	B-1	40	591.8	5,578	5.4	110	3,190	Do.
Harris, M. E	1	40	202.0	889		200	5,800	Do.
Jameson	1	40	202.0	662		200	5,800	Do.
Lewis, A., Unit	1	40	591.8	7,471	6.9	86	2,494	Do.
Do	B-1	40	591.8	7,708	7.0	85	2,465	Do.
Phillips, W. P	1	40	202.0	1,285		200	5,800	Do.
Do	2	40	202.0	1,285		200	5,800	Do.
Total	11	440	4,560.8			1,493	43,297	

Allocation to pipe lines	Daily	Monthly
Standard Oil Co., Pipe Line Department	1,493	43,297

The above allowable oil is 100 percent net oil corrected to 60° F. measured on 100 percent tank tables.

ARKANSAS OIL AND GAS COMMISSION, EL DORADO, ARK., AUGUST 16, 1939

Order No. 38–39

In re conservation and prevention of waste of crude petroleum and natural gas in the State of Arkansas

GENERAL SHUT-DOWN ORDER OF OIL WELLS IN THE REGULATED FIELDS IN THE STATE OF ARKANSAS

Whereas after due notice, hearings have been held in El Dorado, Ark., at various times, including a hearing held on July 27, 1939, with respect to the existence and imminence of waste of oil and gas in the State of Arkansas and the prevention thereof, and

Whereas in view of the evidence, including among other matters the physical conditions in the various fields as reported to the Commission at these hearings by the operators in these fields, from investigation by the Commission's engineering staff and personal study by members of the Commission, and

Whereas on July 31, 1939, the Commission issued its basic allocation of production Order No. 36–39, fixing the allowable production in the various fields operating under production regulation for the tracts, wells, and leases in these fields, and

Whereas the said Order No. 36–39 was issued by the Commission in the face of the fact that evidence was submitted at the hearing on July 27, 1939, that every regulated pool in the state had declined in bottom hole pressure from the previous month. The Commission was petitioned that since this is a period of high oil consumption that it should refrain from taking action towards making allowable reductions usually necessary to retard the declines in bottom hole pressure until a more opportune time.

However the Commission reserved the right, since these schedules of allowed production as between wells and leases in the various fields and pools must be based upon optimum rates of flow, as determined from reservoir surveys made by the Commission's engineering staff and evidence adduced at hearings before the Commission, to increase or decrease the total oil and gas, and consequently, the oil and gas which can be produced as between wells and leases at any time prior to October 1, 1939, upon receipt of authentic information that the schedules are not conducive to the prevention of waste, as waste is defined in act 105.

Now, the Commission finds that there is a need in the interest of conservation and the prevention of waste, to fully investigate the physical conditions of these fields through appropriate tests to be made by its engineering department and as to physical conditions of the fields, and

At the hearing on July 27, 1939, some operators in the Jones Pool of the Schuler Field asserted that undue drainage across property lines is taking place and that remedial measures should be taken to remedy this undue drainage. The Commission desires to fully investigate from a study of the Jones Pool (since the assertion by the operators is a serious one) if undue drainage is taking place in this reservoir, and it can be determined by a series of engineering observations.

Whereas, the Commission finds that in order to study the physical conditions in all of the various fields or pools now operating under production regulations in the State of Arkansas and to make full investigation by a series of bottom hole pressure and other tests and to investigate the likelihood of there being wells that cannot make their present allowable and to investigate the likelihood of undue drainage across property lines that all oil wells in all regulated fields or pools in the State of Arkansas should be closed in beginning Thursday, August 17, 1939, 7 o'clock A. M.,

Whereas, the Commission finds that it can most efficiently make investigation of the various fields or pools operating under production regulation by closing these fields or pools in from production while appropriate tests are being made by its engineering staff, and

Whereas, the Commission finds that all oil wells in these pools or fields can be closed in now, and remain closed in until the necessary investigation is complete, with the least expense to the parties involved and to the State of Arkansas than at any time since the passage of Act 105 of the Fifty-second General Assembly, and

Whereas the commission, under the provisions of said Act 105, is given jurisdiction and authority and it is made the duty of the commission to collect data, make investigations and inspections, examine properties, check, test, and gauge oil and gas wells, etc., to determine whether or not waste exists or is imminent and to remedy the conditions bringing about waste,

Therefore, it is ordered by the Arkansas Oil and Gas Commission that all wells in all regulated fields or pools in the State of Arkansas shall be closed in until further notice. It is ordered that any oil produced from any well located in the fields or pools now operating under production regulations after 7 A. M., Thursday, August 17, 1939, and until further notice shall be "illegal oil."

It is ordered that the schedule "Basic Allocation of Production for August and September, 1939," issued July 31, 1939, as Order No. 36–39 is hereby suspended until further notice.

It is ordered that all operators of oil wells are required to permit and assist the agents of the oil and gas commission in making any and all tests including bottom hole pressure and other determinations that may be required by the Commission on any or all of his wells.

It is ordered that any oil that has been legally produced prior to 7 a. m., Thursday, August 17, 1939, and is now in storage may be run or disposed of so long as such disposal is in accordance with the rules and regulations of the Arkansas Oil and Gas Commission.

It is ordered that no exceptions to this order will be granted except when justified by evidence as presented to the commission in writing to the effect that because of reservoir conditions waste will result from compliance with the shut-down order.

It is ordered and *notice is hereby given* to all oil and gas operators, landowners, royalty owners, leaseholders, and all other parties in interest that the Arkansas Oil and Gas Commission will, at 10 o'clock A. M., Saturday, August 26, 1939, in the county courthouse in the city of El Dorado, Arkansas, hold a hearing for the purpose of giving all parties in interest the opportunity of being heard, and the hearing of evidence to determine whether or not waste of oil or gas, as "waste" is defined in Act 105 of the 52nd General Assembly, is taking place or is reasonably imminent in any or all of the oil or gas fields in the State of Arkansas, and the prevention, thereof, and

At this hearing the Commission specifically desires to hear evidence from the owners, producers, andpurchasers of oil and gas in the Atlanta, Buckner, Lewisville, Magnolia, Schuler, and Village Fields or Pools upon the following subject matter:

1. The bona fide ratable outlet for oil and gas from each of these various fields and pools for the months of *September* and *October*, 1939.

2. The daily rate of production of oil and gas which should be allowed, in accordance with the provisions of Act 105, each of the various fields and pools for the months of *September* and *October*, 1939, and the manner in which this oil and gas should be allocated to tracts, wells, and leases in these fields and pools.

Pursuant to this hearing the Commission will enter such orders, rules, and regulations as in its judgment the testimony and evidence adduced at this hearing warrant.

It is further ordered that any person who knowingly and wilfully violates any provision, rule, regulation, or order of the commission made herein, shall be subject to a penalty of not to exceed One Thousand Dollars ($1,000.00) a day for each and every day of such violation, and for each and every act of violation, such penalty to be recovered in a suit in the circuit court of the county where the defendant resides, or in the county of the residence of any defendant if there be more than one defendant, or in the circuit court of the county where the violation took place. The place of suit shall be selected by the Commission, and such suit, by direction of the commission, shall be instituted and conducted in the nameof the Commission by the Attorney General or under his direction by the prosecuting attorney of the county where the suit is instituted. The payment of any penalty as provided for herein shall not have the effect of changing illegal oil into legal oil, illegal gas into legal gas, or illegal product into legal product, nor shall such payment have the effect of authorizing the sale or purchase or acquisition, or the transportation, refining, processing, or handling in any other way, of such illegal oil, illegal gas, or illegal product, but the contrary, penalty shall be imposed for each prohibited transaction relating to such illegal oil, illegal gas, or illegal product.

Any person knowingly and wilfully aiding or abetting any other person in the violation of any rule, regulation, or order made herein, shall be subject to the same penalties as are prescribed herein for the violation by such other person.

It is further ordered that this docket be kept open to consider any claims of discrimination or hardship, and to offer administrative relief, if possible, and that the Commission is anxious to hear at public hearing, evidence pertaining to any peculiarities of any or all of the wells in the reservoirs affected by this order.

ARKANSAS OIL AND GAS COMMISSION,
A. M. CROWELL, *Director*.

It is so ordered by the Commission:

O. C. BAILEY, *Chairman*.
J. D. REYNOLDS,
L. A. LONGINO,
BASIL HOAG,
EDWIN B. KEITH.

ARKANSAS OIL AND GAS COMMISSION, EL DORADO, ARK., AUGUST 26, 1939

Order No. 40–39

Re: (1) Amending order No. 36–39; (2) giving notice of hearing Tuesday, September 26, 1939.

SPECIAL ORDER CONCERNING THE FIELDS OR POOLS OPERATING UNDER PRODUCTION REGULATION

Whereas, the Arkansas Oil and Gas Commission did hold a hearing on August 26, 1939, in the city of El Dorado, Ark., after due notice as required by law, and at this and other hearings, all parties in interest were given the opportunity of being heard, testimony was accepted and all testimony of prior hearings before the commission was reintroduced and accepted, and

The commission, being fully advised in the premises, does find as fact the following:

1. That on July 27, 1939, a hearing was held before the commission and among other things the question of allocating production was heard, and pursuant to the hearing the commission did issue two orders as follows:

(*a*) *Order No. 35–39.*—Dated July 31, 1939, and in this order the commission recited its findings of fact, its reasons, for the method of allocation of production for the fields and pools operating under production regulation, among them being:

(1) That in the prevention of waste, as waste is defined in said Act 105, and in order that reasonably avoidable drainage of oil and gas from each developed unit which is not equalized by counter drainage, and so that each producer will have the opportunity to produce or receive his just and equitable share of oil and gas (subject to the reasonable requirements for the prevention of waste) the Commission must distribute the allowable production among the producers in the various fields and pools on a reasonable and practical basis.

(2) That the number of acres of a developed unit, or part thereof, is one of the most important factors in estimating or computing the producer's just and equitable share of oil and gas in a field or pool and that this acreage factor must be considered and duly weighed; that the observed and computed bottom hole pressures of the various wells and relative pressure changes from time to time as production proceeds is another important factor in the just and equitable allocation of production, particularly in determining whether drainage is or is not taking place, and that, by the use of the bottom hole pressure factor, correction can be made from time to time in the allocation of allowed current production in order to prevent or diminish such drainage.

(3) That the bottom hole pressure factor, in addition to the value set out in (2) above, is indicative of the relative reservoir energy as among wells and leases in any given pool. Further, the bottom hole pressure factor, or the relative difference in bottom hole pressures as between wells and leases, in any given pool, are indicative of the relative thickness or richness of sand, porosity and permeability of sand, location upon the developed productive structure and the relative recoverable reserves of oil and gas at the time these pressure differences were determined.

(4) That the use of the two factors, acreage and pressure, will enable, and is enabling, the Commission to allocate and distribute the production of oil and gas in a reasonable and practical manner and in full accord with the provisions of said Act 105.

(*b*) *Order No. 36–39.*—Dated July 31, 1939, and in this order the commission set out the basic allowed production for August and September 1939, for the various fields and pools and the wells and leases in the fields and pools operating under production regulation. The method used in arriving at the individual well allowables, in all cases, was acreage times pressure.

2. That between the dates of July 31, 1939, and August 16, 1939, an emergency arose and a change in conditions warranted and invited a further study of the matters under the jurisdiction of the commission. First, the commission was advised by duly accredited officials of the Lion Oil Refining Co. and the Phillips Petroleum Co. that it was their intention to immediately bring suit against the Commission for the purpose of striking down the previously issued orders of the Commission. Secondly, a change in conditions made it possible to more properly investigate and study the fields and pools operating under production regulation with the least expense to the parties involved and to the State of Arkansas than at any time since the passage of Act 105.

3. That the Commission did properly issue an emergency order (as such is defined in Act 105) and recited fully the reasons for its issuance. These findings are from order No. 38–39:

"(*a*) The said Order No. 36–39 was issued by the Commission in the face of the fact that evidence was submitted at the hearing on July 27, 1939, that every regulated pool in the State had declined in bottom hole pressure from the previous month. The Commission was petitioned that since this is a period of high oil consumption that it should refrain from taking action towards making allowable reductions usually necessary to retard the declines in bottom hole pressure until a more opportune time.

"(*b*) The Commission finds that there is a need in the interest of conservation and prevention of waste, to fully investigate the physical conditions of these fields through appropriate tests to be made by its engineering department as to physical conditions of the fields.

"(*c*) At the hearing on July 27, 1939, some operators in the Jones Pool of the Schuler Field asserted that undue drainage across property lines is taking place and that remedial measures should be taken to remedy this undue drainage. The Commission desires to fully investigate from a study of the Jones Pool (since the assertion by the operators is a serious one) if undue drainage is taking place in this reservoir, and it can be determined by a series of engineering observations.

"(*d*) The Commission finds that in order to study the physical conditions in all of the various fields now operating under production regulation in the State of Arkansas and to make full investigation by a series of bottom hole pressure and other tests and to investigate the likelihood of there being wells that cannot make their present allowable and to investigate the likelihood of undue drainage across property lines that all oil wells in all regulated fields in the State of Arkansas should be closed in, beginning Thursday, August 17, 1939, 7 o'clock A. M.

"(*e*) The Commission finds that it can most efficiently make investigation of the various fields operating under production regulation by closing these fields in from production while appropriate tests are being made by its engineering staff.

"(*f*) The Commission finds that all oil wells in these pools or fields can be closed in now, and remain closed in until the necessary investigation is complete, with the least expense to the parties involved and to the State of Arkansas than at any time since the passage of Act 105 of the 52nd General Assembly.

"(*g*) The Commission, under the provisions of said Act 105, is given jurisdiction and authority and it is made the duty of the Commission to collect data, make investigations and inspections, examine properties, check, test and gauge oil and gas wells, etc., to determine whether or not waste exists or is imminent and to remedy the conditions bringing about waste."

4. That, further, the Commission in its Order No. 38–39 ordered that all wells in the fields operating under production regulation be closed in, effective 7 A. M., August 17, 1939, until further notice (the order itself being limited to 10 days by statute); that any oil produced in violation of the order be illegal oil; that the allowable schedule be suspended, that operators assist the Commission's engineers; that legally produced stored oil be cleared; that no exception to the order would be granted unless justified and presented in writing; and a notice of hearing was given for August 26, 1939.

5. That the Commission was hindered in carrying out the intent and purpose of its shut-down order in that there were violations of the order; the Commission and its engineers were engaged in litigation, and finally, the violator refused to allow the Commission to test his wells. These hindrances have prevented the Commission from making the exhaustive tests it was prepared, and planned, to make.

6. The Commission did recite these above (5) facts at the hearing on August 26, 1939, and did hear and give opportunity of being heard to all interested parties.

7. That the tests obtained during the shut-down period have been furnished to all interested parties, at open hearing, and the results and value of the tests were gratifying.

8. The Commission did hear evidence as to the allocation of production which should be set for the various fields and pools operating under production regulation; that is, the amount of oil which could be produced daily without undue drainage and undue waste.

9. That the Commission hesitates to continue an indeterminate shut-down of wells; however, in its judgment it finds that the following orders are necessary in the interest of conservation and the prevention of waste, and would better enable the Commission to carry out the provisions of Act 105.

It is ordered that the schedule (Order No. 36–39, "Basic Allocation of Production, August–September 1939"), which was temporarily suspended August 17, 1939, and which lists the wells, pools and fields operating under production regulation in this state, be, and is, hereby amended as follows:

1. That said Order No. 36–39 shall apply, effective 7 A. M., August 27, 1939, only to the Reynolds Pool of the Schuler Field and the Lime Pool of the Atlanta Field.

2. That said Order No. 36–39, which was temporarily suspended August 17, 1939, shall remain suspended as it affects all wells, pools, and fields except those two pools listed above.

3. That said Order No. 36–39 shall be abrogated, effective 7 A. M., September 1, 1939, as it affects all wells, pools, and fields including those two listed in 1 above.

It is ordered that the Commission will cause to be issued prior to 7 A. M., September 1, 1939, a new schedule (to be designated as Order No. 41–39) setting out the basic allocation of production as between wells and leases in the various fields and pools operating under production regulation.

It is ordered that the schedule to be issued and designated as Order No. 41–39 shall contain daily allowables for the wells in the Jones Pool of the Schuler Field; however, these allowables shall be effective only from 7 A. M., September 4, 1939.

It is ordered and notice is hereby given to all oil and gas operators, landowners, royalty owners, leaseholders, and all other parties in interest that the Arkansas Oil and Gas Commission will, at 10 o'clock A. M., Tuesday, September 26, 1939, in the County Court House in the City of El Dorado, Arkansas, hold a hearing for the purpose of giving all parties in interest the opportunity of being heard, and the hearing of evidence to determine whether or not waste of oil or gas, as "waste" is defined in Act 105 of the 52nd General Assembly, is taking place or is reasonably imminent in any or all of the oil or gas fields in the State of Arkansas, and the prevention thereof, and

At this hearing the Commission specifically desires to hear evidence from the owners, producers, and purchasers of oil and gas operating under production regulation in the Atlanta, Buckner, Magnolia, Schuler, and Village Fields or pools upon the following subject matter:

1. The bona fide ratable outlet for oil and gas from each of these various fields and pools for the months of October and November 1939.
2. The daily rate of production of oil and gas which should be allowed in accordance with the provisions of Act 105, each of the various fields and pools for the months of October and November 1939, and the manner in which this oil and gas should be allocated to tracts, wells, and leases in these fields and pools.

Pursuant to this hearing the Commission will enter such orders, rules and regulations as in its judgment the testimony and evidence adduced at this hearing warrant.

It is further ordered that this docket be kept open to consider any claims of discrimination or hardship, and to offer administrative relief, if possible, and that the Commission is anxious to hear at public hearing, evidence pertaining to any peculiarities of any or all of the wells in the reservoirs affected by this order.

Arkansas Oil and Gas Commission,
A. M. Crowell, *Director.*

It is so ordered by the Commission:

O. C. Bailey, *Chairman.*
Robert J. Short.
L. A. Longino.
Edwin B. Keith.

Mr. Kelly. We will hear Mr. William S. Rial.

STATEMENT OF WILLIAM S. RIAL, DEPUTY ATTORNEY GENERAL, STATE OF PENNSYLVANIA, REPRESENTING THE GOVERNOR OF THE STATE OF PENNSYLVANIA, HARRISBURG, PA.

Mr. Rial. Mr. Chairman and members of the committee, I did not come with a prepared statement and what I have prepared and will submit to you is the result of some thoughts of my own since I have been here and if I should happen to be repetitious and state to the committee some things which have heretofore been said, I hope that you may pardon my trespassing.

Pennsylvania is against this bill. Pennsylvania was the pioneer in the production of oil in this country. More than 80 years ago on Oil Creek near Oil City, Pa., Colonel Drake discovered oil. Since that time Pennsylvania has produced large quantities of oil and gas. In that production, however, it is now one of the smaller producing States.

There are in Pennsylvania today wells which were drilled more than 60 years ago and are still producing oil in paying, though of limited quantities.

There is no waste in the production of oil in Pennsylvania except that irreducible minimum which always accompanies the industry.

What we desire to emphasize here in connection with this bill is this, that the industry in Pennsylvania has accomplished its own conservation program by the adoption of methods, which initiative and inventive genius have developed.

Pennsylvania with its industries, therefore, is against this bill and it joins with the other States which have appeared before you by their Governors as opposing this bill, because the Governor of Pennsylvania believes that it is an invasion of the rights of the States.

You have heard here for 2 days the testimony of these various Governors explaining their position with respect to that, and you have heard, and I have heard here some very interesting things.

The business in Pennsylvania is very different, of course, from that of the Southwestern States. We do not, and no sensible man can, believe in wastefulness. We think that this bill, if it should pass, should be predicated upon this proposition, that it is established beyond doubt that there is a wastefulness, a waste in the industry, and it must be passed or ought to be passed only in view of the constitutional provisions, under some imperious use necessity, such as war, which does not exist.

But, there is in our view of the situation another factor which we regard of such importance that we deem it our duty to call it to the committee's attention. Industry in America has always been able to correct its own economic abuses. We heard yesterday how the quality of petroleum production had been improved and how the cost to the public had been reduced. That did not come from public or governmental regulation, but out of the industry's own initiative.

It is doubtful if any central agency at Washington or any commission, or any bureau, could have brought about that situation.

Industrial life in America has challenged the world in its development of efficiency and economy in producing its products. This is not a mere accident of fortune, but it arises out of the genius of our own people and we venture the opinion, that if the Government keeps its hands off, leaving to the States the peculiar and many problems which have been indicated to you of the oil control and conservation, the question can and will be settled.

There is no great industry in America today that can stand still and continue to regulate and manage its business according to the standards and methods of even 20 years ago. The competitive factors in industry demand continual research and resourceful initiative in order to be successfully controlled and continued in business. We have idealized that in this country. In the pioneering spirit, we have held that up to the rising generations the glorious traditions of our forefathers, how they went out to conquer the wilderness and made on this continent the richest and the happiest empire the world has ever seen.

The frontiers of life, gentlemen, today, are ever widening and in industry today in its continuing economic needs, there are still vast areas which call for individual initiative, for the pioneering spirit of a free people generated out of, as I said a minute ago, out of our form of government. If you lay the dead hand of governmental control out of all proportion to the needs upon any industry, to that extent you close the door of opportunity to thousands of bright young men and women now coming out of our schools who only want a chance to make their contribution to American life and happiness and prosperity.

Herein was the wisdom of the founding fathers when they founded this Republic in the theory that the least government is the best, leaving to the sovereign States the local problem to work them out as best they could and 150 years of experimenting has demonstrated the truth of this wisdom.

We have faith in the American people and we do not believe that Uncle Sam shall do everything. Our experience in Pennsylvania for these 80 years in the oil industry, and more, has demonstrated that Federal control is unnecessary and that the oil and gas industry in sheer self-defense must conserve its resources through State control, and of experimenting.

Who developed the great oil fields in America? Why, it was the wild-catter, the hardy pioneering spirit who staked everything he had in the venture that below the surface there might be oil.

We have talked here a great deal about waste. We do not consider the great waste which has—call it that if you please—which has occurred to the thousands of men who from the Atlantic to the Pacific drilled dry holes and died in abject poverty. It seems to us, gentlemen, this is our position and especially in view of what has developed at this hearing before this committee, that the problems of this industry, varied as they are, do not lend themselves readily to governmental control and we take the position that more than anything else, this bill assumes as a basis a function in the Federal Government which goes beyond its limits and is not warranted by the Constitution of the United States.

Mr. KELLY. Mr. Rial, what is the daily production now of the State of Pennsylvania?

Mr. RIAL. I cannot tell you, Mr. Chairman. I really am not a technical expert on oil production. We will have a representative of the industry here who will answer that question. But I believe this to be the fact—now, this is just a matter of belief—I believe the average daily production of oil from the wells in Pennsylvania is six-tenths of a barrel per day, with possibly 80,000 wells.

Mr. KELLY. They are practically all stripper wells.

Mr. RIAL. Well, if I understand what that means, yes; that is they are pumped.

Mr. WOLVERTON. Is limitation of production by other States helpful to the Pennsylvania oil industry?

Mr. RIAL. Pennsylvania oil has its own peculiar market, and I do not think that the shutting down of production in any way affects us. Now, that is my notion of things, Congressman.

Mr. WOLVERTON. It has seemed from what has been said by the representatives of some of the States that have appeared here that the oil industry had your situation in Pennsylvania in mind when they urged the advantages of limitation of production.

Mr. RIAL. I am a lawyer by profession and I happen to be deputy attorney general of Pennsylvania, and I have not any technical knowledge of the business itself except that generally following which everyone gets who goes through the oil fields, although my father was in the oil business in Oklahoma for some years and, of course, I picked up some knowledge from him; but outside of that I have no technical knowledge whatever of the industry.

Mr. KELLY. We thank you, Mr. Rial.

Mr. RIAL. Thank you.

Mr. KELLY. We will hear Dr. R. A. Smith.

STATEMENT OF DR. R. A. SMITH, REPRESENTING GOVERNOR LUREN D. DICKINSON OF THE STATE OF MICHIGAN

Dr. SMITH. Mr. Chairman and gentlemen of the committee——

Mr. KELLY. Doctor, you represent Governor Dickinson of the State of Michigan.

Dr. SMITH. That is right.

Mr. KELLY. I wish to state at this time, Doctor, one of the former members of this committee, the late Carl Mapes, from your State was one of the most loved men in the House of Representatives. He passed away while actively engaged in the work of this committee in New Orleans. He was one of the most loved public servants in Congress. You may proceed.

Dr. SMITH. We in Michigan loved him the same way, because of the real man he was. I happened to be at the committee hearings in New Orleans when he passed away. It was certainly a great shock.

I have only a short statement to present which was prepared in collaboration with and concurred in by the Governor, by the conservation commission, and also the oil and gas advisory board.

This short statement was prepared with the full knowledge that the older oil States would have people here who would analyze and discuss the various provisions of the Cole bill in detail. Hence, we are just making a statement of our position, of the conditions that were and are, and how we are trying to handle them.

The vital importance of our petroleum resources to the welfare and safety of the Nation is not in dispute. That it is recognized by the people of Michigan is evidenced by the fact that the legislature at its 1939 session enacted a strong and comprehensive oil- and gas-conservation measure. This act—No. 61—provided for a supervisor of wells with broad powers but with proper checks and balances, for an advisory board of oil operators of standing and experience, for adequate and competent administrative personnel, for sufficient funds for the effective administration and enforcement of the act, for research to determine the most effective and equitable methods and means for preventing avoidable wastes in our petroleum industry, and to conserve the oil and gas reserves of the State.

The act was patterned after the so-called model petroleum conservation act of New Mexico but broadened by the inclusion of desirable features from similar petroleum acts in other States. It was strengthened further by defining and including under the provisions of the act other forms of waste of peculiar and menacing character to the recreational resources and water supplies of Michigan. Moreover, by this act the oil industry is also charged with the definite responsibility of cooperating in the formulation of proper rules and regulations for the prevention of waste in the oil and gas industry and for the conservation of the State's oil and gas resources.

Although this act—No. 61—was passed and given immediate effect only 9 months ago, the advisory board as called for has been selected and appointed; an administrative organization of competent engineers, geologists, and assistants has been completed; rules and regulations covering general operating activities have been promulgated; and proration schedules of production for eight of our fields have been issued.

When this law was passed last May, waste was occurring in several new fields. Discovery of several fields within a short period of time, excessive town lot drilling, wide open production of wells with consequent gross wastes from loss of reservoir energy and drowning of wells, rapid water encroachment, overproduction, and demoralized market conditions were the immediate causes of the passage of the act, and particularly the attachment of the immediate-effect clause. These conditions and practices soon were brought under control by proration and communitization rules and regulations, and many of the wastes were promptly eliminated, greatly reduced, or prevented.

The benefits from these regulatory measures to individual producers and to the industry were soon so pronounced that many of the former antagonists of the act became strong supporters of proration and other conservation measures.

Research work already has been initiated and is being continued to obtain the facts and information necessary to determine if better and more equitable methods and means or bases of proration can be found and also if more efficient methods and means of producing and conserving our oil and gas reserves can be developed. This program has been strongly supported by the advisory board and the oil operators in general.

It should not be understood that the 1939 act (No. 61) was the first oil-conservation measure. It was merely a logical successor to previous legislation which had developed as the need became apparent. An 1897 act was aimed at preventing the intermingling of brine and fresh water which threatened at the time of the early salt development. Legislative enactments in 1927, 1929, and also in 1931 followed the discovery and exploitation of the Saginaw and Muskegon fields where unwise practices in connection with these operations emphasized the necessity of control, but none of these acts provided for proration.

Practices of overdrilling with consequent dissipation of gas reserves resulted in serious waste of oil and gas resources and brought about concerted action by operators and others interested to remedy the situation.

The law now in force was signed on May 3, 1939, and because of then existing and imminent physical and economic wastes it was given immediate effect. Through the exercise of emergency powers given the supervisor of wells and prompt action by those most concerned, the existing and the imminent wastes incident to the uncontrolled competitive drilling in town lot and highly productive oil areas and to wide open production methods were largely eliminated within a few months after the enactment of this law.

Funds for the administration of the act are provided through the payment of a fee of $25 for each drilling permit and a privilege fee of one-eighth cent a barrel of oil produced and sold. In addition to the specific machinery, personnel, and funds provided, the administrative and enforcement work is supplemented by other personnel and funds provided for general conservation work of the conservation department. We now feel that the powers, machinery, and funds provided are adequate for the proper conservation and protection of the oil resources of the State.

The bill under consideration here we believe to be unnecessary. As has been pointed out, our State has recognized fully its duty to conserve its oil and gas resources and accordingly has enacted a strong oil conservation law. Provisions have been made for competent personnel and funds for the administration and enforcement of the act.

Were the Cole bill or any other bill of similar nature to be enacted we would consider it to be an unwarranted invasion of the constitutional rights of the State. It would cause an unnecessary and large duplication of effort and expense because of the activities of regulatory bodies now in existence. It naturally would result in conflict and confusion on the part of everyone involved, but especially on the operators and producers. We further believe it to be usurping a right and responsibility that belongs to the States and to the States alone and that it therefore should not be enacted.

I might say that accompanying this short statement we are delivering to the several members of the committee copies of Act No. 61, Public Acts of 1939, rules and regulations and proration orders promulgated under that act, and a map showing the various oil fields, pipe lines, and refineries in Michigan.

Of course, Michigan is relatively a small oil State. We produced only about 23,500,000 barrels of oil last year. We have nearly 2,800 oil wells and about 450 gas wells. But, it is a very important industry to us. We feel that in Michigan we have a rather unique situation. We have put it up to the oil industry this way, "The State gives you the opportunity to put your house in order and keep it in order, and in fact will assist you; but to the degree that you do not, cannot, or will not, the State will step in and carry on."

This has resulted in very fine cooperation between the industry and the State officials. The advisory board is composed of six men of broad experience in the oil and gas industry who meet monthly or oftener with the supervisor of wells, and his staff.

All of the problems are thrashed out together. As a consequence the industry has a thorough understanding at all times of what our organization in Lansing is thinking and we in turn have a good idea of what the industry is thinking and also doing.

Mr. WOLVERTON. Dr. Smith, did Michigan shut down production of oil last August?

Dr. SMITH. No. We were such a young State and we were so far away from the mid-continent States that we did not see any occasion for it. We were in the midst of trying to get our wells to a proration allowable low enough to be sure that we were accomplishing the objects of our oil conservation act. Then the thing we were watching as much as anything else was to see that we did not interfere with the markets.

Mr. WOLVERTON. Did you shut down?

Dr. SMITH. No.

Mr. WOLVERTON. You passed an order, did you not?

Dr. SMITH. To shut down?

Mr. Wolverton. Yes.

Dr. Smith. No.

Mr. Wolverton. What does this mean then? I have before me an order which was, or purports to have been adopted by your commission, a proration order dated August 22,1939, by which the department of conservation reduced the allowable production in the prorated fields and added one field to the list of prorated fields and the reasons given were:

> Upon recommendation of the advisory board and after receipt and consideration of estimates of the market demand for crude oil for the next 30 days; after considering the number of producing wells expected to be completed within the next 30 days, it appears that the production of oil in the State of Michigan is and will be in excess of the market demand and information shows that there is water encroachment in some of the prorated fields.

Does that not indicate the wells were to be closed down for 30 days?

Dr. Smith. No; the order was—I do not know whether the one read was the order or not—but it was an emergency order fixing a top allowable of 100 barrels. That meant that while all wells could operate the 3,000-barrel wells could not be produced wide open as they had prior to the act. There were no wells shut-down in Michigan—except a few wells closed for violations of proration orders.

Mr. Wolverton. Did you attend the meeting of the interstate oil compact commission?

Dr. Smith. I did not.

Mr. Wolverton. Is there any significance in the fact that the order was passed on August 22 at or about the time the other States were shutting down production?

Dr. Smith. None that I know of other than the fact that if there, was a flood of oil somewhere else and we were not able to get markets we would have a flood of oil in Michigan. We would have a lot of operators with no unfilled storage. What we are up against in Michigan is this: Only 1,000,000 barrels of storage in the whole State and half of that is owned by one company. The problem is to see that those little refineries that have only 12 to 36 hours of storage, have continuous supplies of oil.

We were more concerned to see that they had their supplies than almost anything else, because it had been charged before the passage of the bill that we were going to put the little refineries out of business. Naturally that was one of the things we certainly did not want to do.

We had our own refinery markets, therefore, we did not want in any way to cripple any refinery.

Mr. Wolverton. Were any wells shut down under the order I read?

Dr. Smith. No well was shut down under any proration order—except a few wells because of violations.

Mr. Wolverton. What was the purpose in the passage of the Michigan proration order dated August 22, if nothing was to be done under it?

Dr. Smith. Because the Walker field, which is just outside of Grand Rapids, was in its heyday of development and there was a flood of oil coming out of it faster than we could build refineries and faster than we could develop transportation facilities. We could see very plainly there would be a flood of oil there and that it would be demoralizing to the little fellows who do not have adequate storage.

While they would have to shut down some of their more fortunate neighbors would at once take over the markets.

Mr. WOLVERTON. What were the changed conditions that made it unnecessary for this order to be made effective?

Dr. SMITH. This order was made effective, but the top allowable was 100 barrels.

(NOTE.—This emergency order after a public hearing was superseded by Proration Order No. 3, effective September 13, 1939, which embodied this emergency order and all previous proration orders. The 100-barrel top allowable still stands.)

Perhaps I should say that when we were given this work, the problem was how to prorate our wells and get their production down somewhere near where it should be even though proper information was lacking. We had no money, no office or field organization, nor any rules, to do the work, and still we were faced with a flood of oil. So at the beginning we made an emergency proration order of a top allowable of 200 barrels for each well on a 10-acre unit.

Mr. WOLVERTON. What was your daily production of oil in Michigan prior to the passage of this order?

Dr. SMITH. I presume that it was somewhere around 60,000 barrels—68,769 barrels for August.

Mr. WOLVERTON. What was it after you passed this emergency proration order?

Dr. SMITH. It probably went up to around 65,000—dropped to 63,035 in September but increased to 64,946 barrels in September and 68,034 barrels in October. There was hardly any increase in the Walker field.

Mr. WOLVERTON. It went up instead of down?

Dr. SMITH. Everybody had all of the oil he wanted.

Mr. WOLVERTON. Why did it go up instead of down under the order as made?

Dr. SMITH. Well, because of the fact that the wells in the Walker field were coming in so fast. This is a shallow field and some of these wells came in with initial productions as high as three and four thousand barrels a day. We expected in 30 days that about 65 wells would be drilled in. There was every indication that many would be good producers, because most of them were inside locations. Many of these wells were owned by what are called the little fellows.

(NOTE.—In spite of emergency order of August 22, production in the Walker field increased about 800 barrels in September and nearly 3,700 barrels daily in October.)

Mr. WOLVERTON. Was the passage of this emergency proration order of August 22 based in any measure upon the situation that was causing the other States to close down production?

Dr. SMITH. No; we were up against something that was more imminent than anything that was happening in the other States. It was a flood of oil that we were facing and the charge that we were being handled by the big companies.

Mr. WOLVERTON. Then according to your explanation it was just coincidental that you should be taking action of this kind at the same time the other States were taking similar action?

Dr. SMITH. We would have had to take action within a week or two at the most. It simply had to be done.

Mr. WOLVERTON. We have just heard what Arkansas had to do also, and I suppose the other States will say the same thing; but the fact remains they all took action at the same time for one reason or another.

Dr. SMITH. Oil was coming into the picture, encroaching on our markets, and without any more immediate markets being opened to us, there was nothing else that we could see to do. We had to take care of all of our refineries, and we have done so ever since the August emergency order was issued.

Mr. WOLVERTON. I do not say that you have not given the real reasons as to Michigan.

Dr. SMITH. We do not have to pay much attention to the Southwest, because we are facing real problems of our own.

Mr. WOLVERTON. Probably Colonel Thompson will tell us about that.

Dr. SMITH. The day before I came here, we had the same problem come up; but it arose because a rather important refinery had to go off stream and there was no unfilled storage for some of the little fellows. The situation was locally so acute that we had to call a special meeting of the oil and gas advisory board, but within just a few hours members of the board found markets for the producers to get rid of their oil until this refinery could get back on stream.

Mr. KELLY. Dr. Smith, does the present production of oil in Illinois have any material effect upon the marketing of Michigan oil?

Dr. SMITH. We do not know, because of our limited out-State pipe-line outlet and relatively small production. We have only one out-State pipe line and that is to Toledo. We sent out, I think, only about 14,000 barrels; no, not that much, only 8,000 to 10,000 barrels per day. We do not know how much they would encroach upon us. It seems largely indirect competition.

Mr. KELLY. A great deal of it comes into Chicago through the Lakes there.

Dr. SMITH. No. You see, we have so little pipe-line outlet; just the one pipe line going out of the State, and that goes to Toledo. We have nothing going the other way. That is toward Chicago. Formerly some oil was transported by barge or tanker to Whiting, Ind., and a little by tank car into Indiana.

Mr. KELLY. All right, thank you, Doctor.

(The Michigan Act No. 61, Public Acts of 1939, rules and regulations of oil fields, pipe lines, and refineries in Michigan above referred to are as follows:)

[Act No. 61, P. A. 1939, State of Michigan, 60th Legislature, regular session of 1939. Introduced by Messrs. Thomson, MacKay, and Hampton—Bill No. 139]

HOUSE ENROLLED ACT NO. 37

AN ACT to provide for a supervisor of wells; to prescribe his powers and duties; to provide for an advisory board and an appeal board; to prescribe their powers and duties; to provide for the prevention of waste and for the control over certain matters, persons, and things relating to the conservation of oil and gas, and for the making and promulgation of rules, regulations, and orders relative thereto; to provide for the enforcement of such rules, regulations, and orders and of the provisions of this act, and to provide penalties for the violations thereof; to provide for the assessment and collection of certain fees; and to repeal Act No. 15 of the Public Acts of 1929, as amended

The People of the State of Michigan enact:

SECTION 1. It has long been the declared policy of this state to foster conservation of natural resources to the end that our citizens may continue to enjoy the fuits and profits thereof. Failure to adopt such a policy in the pioneer days of the state permitted the unwarranted slaughter and removal of magnificent timber abounding in the state, which resulted in an immeasurable loss and waste. In an effort to replace some of this loss, millions of dollars have been spent in reforestation, which could have been saved had the original timber been removed under proper conditions.

Within the past few years extensive deposits of oil and gas have been discovered which have added greatly to the natural wealth of the state, and if properly conserved can bring added prosperity for many years in the future to our farmers and land owners, as well as to those engaged in the exploration and development of this great natural resource. The interests of the people demand that exploitation and waste of oil and gas be prevented so that the history of the loss of timber may not be repeated.

It is accordingly the declared policy of the state to protect the interests of its citizens and land owners from unwarranted waste of gas and oil and foster the development of the industry along the most favorable conditions and with a view to the ultimate recovery of the maximum production of these natural products. To that end this act is to be construed liberally in order that effect may be given to sound policies of conservation and the prevention of waste and exploitation.

SEC. 2. Unless the context requires a different meaning, the words defined in this section shall have the following meaning when found in this act, to wit:

(a) "Person" means any natural person, corporation, association, partnership, receiver, trustee, so-called common law or statutory trust, guardian, executor, administrator, and a fiduciary of any kind.

(b) "Oil" means natural crude oil or petroleum and other hydro carbons, regardless of gravity, which are produced at the well in liquid form by ordinary production methods and which are not the result of condensation of gas after it leaves the underground reservoir.

(c) "Gas" means casing-head gas, or gas produced incidental to the production of oil.

(d) "Pool" means an underground reservoir containing a common accumulation of oil or gas or both. Each productive zone of a general structure which is completely separated from any other zone in the structure, or for the purposes of this act may be so declared by the supervisor of wells, is covered by the word "pool" as used herein.

(e) "Field" means the general area which is underlain or appears to be underlain by at least one pool; and "field" also includes the underground reservoir or reservoirs containing such oil or gas, or both. The words "field" and "pool' men the same thing when only one underground reservoir is involved; however, "field," unlike "pool," may relate to 2 or more pools.

(f) "Product" means any commodity or thing made or manufactured from oil or gas, and all derivatives of oil or gas, including refined crude oil, crude tops, topped crude. processed crude petroleum, residue from crude petroleum, cracking stock, uncracked fuel oil, fuel oil, treated crude oil, residuum, gas oil, naphtha, distillate, gasoline, casing-head gasoline, natural-gas gasoline, kerosene, benzine, wash oil, waste oil, lubricating oil, and blends or mixtures of oil or gas or any derivatives thereof whether enumerated or not.

(g) "Owner" means the person who has the right to drill into and produce from any pool, and to appropriate the production either for himself or for himself and another or others.

(h) "Producer" means the operator, whether owner or not, of a well or wells capable of producing oil or gas or both in paying quantities.

(i) "Commission" means the commission of conservation for the state of Michigan.

(j) "Supervisor" means the supervisor of wells as provided by this act.

(k) "Board" means the advisory board appointed, as provided in this act, by the director of conservation of Michigan.

(l) As used in this act, the term "waste" in addition to its ordinary meaning, shall include:

(1) "Underground waste" as those words are generally understood in the oil business, and in any event to embrace (1) the inefficient, excessive, or improper use or dissipation of the reservoir energy, including gas energy and water drive, of any pool, and the locating, spacing, drilling, equipping, operating, or producing of any well or wells in a manner to reduce or tend to reduce the total quantity of oil or casing-head gas ultimately recoverable from any pool, and (2) unreasonable damage to underground fresh or mineral waters, natural brines, or other mineral deposits from operations for the discovery, development, and production and handling of oil or cashing-head gas.

(2) "Surface waste," as those words are generally understood in the oil business, and in any event to embrace (1) the unnecessary or excessive surface loss or destruction without beneficial use, however caused, of casing-head gas, oil, or other product thereof, but including the loss or destruction, without beneficial use, resulting from evaporation, seepage, leakage, or fire, especially such loss or destruction incident to or resulting from the manner of spacing, equipping, operating, or producing well or wells, or incident to or resulting from inefficient storage or handling of oil, (2) the unnecessary damage to or destruction of the surface, soils, animal, fish or aquatic life or property from or by oil and gas operations; and (3) the drilling of unnecessary wells.

(3) "Market waste", which shall embrace the production of oil in any field or pool in excess of the market demand as defined herein.

(m) The words "market demand" as used herein shall be construed to mean the actual demand for oil from any particular pool or field for current requirements for current consumption and use within or outside the state, together with the demand for such amounts as are necessary for building up or maintaining reasonable storage reserves of oil or the products thereof, or both such oil and products and shall not be less than the actual purchasing commitments for oil from such pool or field.

(n) "Illegal oil" shall mean oil which has been produced within the state from any well or wells in excess of the amount allowed by any valid rule, regulation or order of the supervisor as distinguished from oil produced in the state not in excess of the amount so allowed, which is "legal oil."

(o) "Illegal product" shall mean any product of oil or gas or any part of which was processed or derived in whole or part knowingly from illegal oil as distinguished from "legal product" which is a product processed or derived to no extent from illegal oil.

(p) "Illegal conveyance" shall mean any conveyance by or through which illegal oil or illegal oil products are being transported.

(q) "Illegal container" shall mean any receptacle which contains illegal oil or illegal oil products.

(r) "Tender" shall mean a permit or certificate of clearance for the transportation of oil or products, approved, and issued or registered under the authority of the supervisor.

Sec. 3. The director of conservation of the state shall act as the supervisor of wells. He shall designate with the approval of the commission such suitable assistants as may be required to carry out the provisions of this act, and after conference with and recommendations by oil and gas producers or operators or their representatives, shall, subject to approval by the commission, appoint 6 persons who shall constitute a board to be known as the advisory board. 3 members of the board shall be chosen from independent oil and gas producers or operators, or their managing agents or representatives, whose ownership, production, or operations are chiefly within the state of Michigan; and other 3 members shall be chosen from oil and gas producers or operators or managing agents or representatives whose ownership, production, or operations are chiefly interstate and who directly or indirectly through controlled subsidiaries are engaged as actual oil producers in 5 or more states, including Michigan: *Provided, however,* There will be not more than 1 representative from 1 company or any of its subsidiaries or affiliates.

The members of the advisory board shall be selected with special reference to their training, experience and standing as oil and gas producers and operators, or as managing agents or representatives of such, and no one shall be appointed a member of the advisory board who has not been a resident of the state of Michigan for at least 2 years next preceding his appointment and has not had at least 5 years of practical or technical experience as a producer or operator himself or as managing agent or representative of oil and gas producers or operators.

The term of each member of the advisory board shall be for 3 years: *Provided,* That of the first 6 members selected, 2 shall serve for 1 year, 2 for 2 years, and 2 for 3 years. The supervisor, after conference with and recommendations by oil and gas producers, and operators of their managing agents or representatives shall fill any vacancy occurring in the membership of the advisory board subject to the approval of the commission, and may remove any member thereof for good cause, except for political reasons or causes, after a full public hearing and approval by the commission. Each member of the board, unless removed in the manner herein provided, shall serve until the appointment and qualification of his successor.

Each member of the board shall qualify by taking and subscribing to the constitutional oath of office and by filing same in the office of the secretary of state. The board, after having qualified, shall immediately, and annually thereafter, meet at the office of the supervisor of wells in Lansing and organize by electing a chairman and a vice-chairman. 4 members of the board shall constitute a quorum for the transaction of business. The board shall hold at least 1 meeting each month, and such other meetings as it may deem necessary upon such notice as the board shall provide unless such notice is waived by each member. Meetings shall be held at the office of the supervisor of wells at Lansing, or at such other place in the state of Michigan as may be fixed by the board or the supervisor. Meetings shall be called by the chairman or in his absence by the vice-chairman, or by a majority of the members of the board or by the supervisor.

In addition to the powers and duties of the board which are herein specifically stated, it shall, when requested by the commission or the supervisor, consult and advise with the commission or the supervisor, and shall perform such other duties as may be lawfully delegated to it by the supervisor in the administration of this act. The board shall have the right to participate officially in all public hearings provided for in this act, and also the right upon request being made by the board to consult promptly with the supervisor with respect to the rule, or regulation or order, which should be made in view of such hearing.

The board shall, at all reasonable times, have access to all office records, documents, orders, etc., of the supervisor excepting such records as are hereinafter provided in sections 6 (d) and 23 (a) and shall be kept informed by bulletins or otherwise agreed plan as to the conduct of the supervisor relative to the enforcement of this act.

The commission of conservation shall act as an appeal board. Whenever the advisory board or any producer or owner deems any rule, regulation, order, action, inaction, or procedure as proposed, initiated or made by the supervisor to be unduly burdensome, inequitable, unreasonable, or unwarranted, said board, producer, or owner may appeal to the appeal board for relief from such rule, regulation, order, action, inaction, or procedure, giving due notice to the supervisor. The chairman of the commission shall set a date and place to hear such appeal, which may be at any regular meeting or at any special meeting of the commission duly called for such purpose. The supervisor, members of the board, or any person interested in the matter shall have the right to be heard at such hearing.

The action of the appeal board shall be final with respect to an appeal by the advisory board, but any person may seek relief in the courts as provided elsewhere in this act, and the taking of an appeal as herein provided shall not be a prerequisite to seeking relief in the courts, anything herein to the contrary notwithstanding.

The supervisor and employees shall, in addition to their salaries, receive their reasonable expenses while away from their repsective homes traveling upon business connected with their duties. The members of the board and of the appeal board shall receive no compensation, but each member shall be entitled to reasonable expenses while traveling in the performance of any of the duties hereby imposed. All salaries and expenses authorized hereunder shall be paid out of the state treasury in the same manner as the salaries and expenses of other officers and employees of the conservation department are paid.

It shall be the duty of the board of state auditors to furnish suitable offices for the use of the supervisor, the board, and the employees.

Sec. 4. It shall be unlawful for any person to commit waste in the exploration for or in the development, production, or handling or use of oil or gas; or in the handling of any product thereof.

Sec. 5. The supervisor shall have, and he is hereby given (a) jurisdiction and authority over the administration and enforcement of the provisions of this act and all matters relating to the prevention of waste as defined herein, and to the conservation of oil and gas in this state; and (b) jurisdiction and control of and over all persons and things necessary or proper to enforce effectively the provisions of this act and all matters relating to the prevention of waste and the conservation of oil and gas.

Sec. 6. The supervisor is hereby empowered, and it is his duty to prevent the waste prohibited by this act. To that end, acting directly or through his authorized representatives, the supervisor, after consulting with the board, is specifically empowered (a) to make and enforce rules and regulations subject to the approval of the commission, issue orders and instructions necessary to enforce such rules and regulations, and to do whatever may be necessary with respect to the subject matter stated herein to carry out the purposes of this act, whether or not indicated, specified, or enumerated in this or any other section hereof; (b) to collect data to make inspections, studies, and investigations, to examine such properties, leases, papers, books, and records as are necessary to the purposes of this act; to examine, check, and test and gauge oil and gas wells and tanks, plants, refineries, and all means and modes of transportation and equipment, to hold hearings, to provide for the keeping of records and making of reports, and for the checking of the accuracy thereof; and (c) to require the locating, drilling, deepening, redrilling or reopening, casing, sealing, operating, and plugging of wells drilled for oil and gas or for geological information or as key wells in secondary recovery projects, or wells for the disposal of salt water, brine, or other oil-field wastes, to be done in such manner and by such means as to prevent the escape of oil or gas out of one stratum into another, or of water or brines into oil or gas strata; to prevent damage to or destruction of fresh-water supplies and valuable brines by oil, gas, or other waters, to prevent the escape of oil, gas, or water into workable coal or other mineral deposits; to require the disposal of salt water and brines and oily wastes produced incidental to oil and gas operations, in such manner and by such methods and means that no unnecessary damage or danger to or destruction of surface or underground resources, to neighboring properties or rights, or to life, shall result: *Provided, however*, That any such well may be plugged to a fresh-water level and not to the surface in case such well is desired to be used as a water well.

(d) To require reports and maps showing locations of all oil and gas wells, the keeping and filing of logs, well samples, and drilling and operating records or reports: *Provided, however*, All well data and samples furnished the supervisor shall, upon request of owner of well, be held confidential for 90 days after the completion of a well and not open to public inspection except by written consent of the owner: *Provided further, however*, That no producer shall be required to submit or file logs or reports of core or test wells drilled for geological purposes only, nor required to furnish well samples of such core or test wells.

only, nor required to furnish well samples of such core or test wells.

(e) To prevent the drowning by water of any stratum or part thereof capable of producing oil or gas, or both oil and gas, in paying quantities, and to prevent the premature and irregular encroachment of water, or any other kind of water encroachment, which reduces, or tends to reduce the total ultimate recovery of oil or gas, or both such oil or gas, from any pool.

(f) To prevent fires or explosions.

(g) To prevent "blow-outs," "seepage," and "caving" in the sense that the conditions indicated by such terms are generally understood in the oil business.

(h) To regulate the "shooting" and chemical treatment of wells.

(i) To regulate the secondary recovery methods of oil and gas, including the pulling or creating a vacuum, the introduction of gas, air, water, and other substances into the producing formations.

(j) To fix the spacing of wells.

(k) To require the operation of wells with efficient gas-oil ratios and to fix such ratios.

(l) To require by written notice immediate suspension of any operation or practice and the prompt correction of any condition found to exist which is causing or resulting or threatening to cause or result in waste.

(m) To require either generally, or in, or from particular areas, certificates of clearance or tenders in connection with the transportation of oil, gas, or any product thereof.

(n) To identify the ownership of oil and gas-producing leases, properties, and wells.

(o) To make rules, regulations, or orders for the classification of wells as oil wells or gas wells; or wells drilled, or to be drilled, for geological information, or as key wells for secondary recovery projects, or wells for the disposal of salt water, brine, or other oil-field wastes.

(p) To require surety bonds of owners, producers, operators, or their authorized representatives in such reasonable form, condition, term, and amount as will insure compliance with this act and with the rules, regulations, or orders issued thereunder.

SEC. 7. Upon the initiative of the supervisor or the board, or upon verified complaint of any person interested in the subject matter alleging that waste is taking place or is reasonably imminent, the supervisor shall call a hearing, or direct the board to call a hearing, to determine whether or not waste is taking place or is reasonably imminent, and what action should be taken to prevent such waste. Whenever the supervisor so directs, the board shall hold a hearing and shall promptly make its findings and recommendations, and the supervisor shall promptly consider the same, promulgating such rules, regulations, or orders as he may deem necessary to prevent waste as defined herein, which he finds to exist or to be reasonably imminent.

SEC. 8. The supervisor, after consulting with the board and considering its recommendations, shall prescribe rules of order or procedure in hearings or other proceedings before him or the board under this act. Any notice required to be given under this act or under any rule, regulation or order issued by the supervisor, shall be by personal service on the person affected, or by such general notice as the supervisor may fix. All rules, regulations and orders made by the supervisor shall be entered in full in a book to be kept for such purpose by the supervisor. A copy of any such rule, regulation or order, certified by the supervisor, shall be received in evidence in all courts of the state with the same effect as the original.

SEC. 9. The supervisor may, and is hereby authorized, to compel by subpoena, the attendance of witnesses, the production of books, papers, records, or articles necessary in any proceeding before him, the board, or the commission. No person shall be excused from obeying the command of any subpoena issued in any hearing or proceeding brought under the authority of this act on the ground or for the reason that the testimony or evidence, documentary or otherwise, may tend to incriminate him or subject hin to a penalty or forfeiture: *Provided*, That nothing herein contained shall be construed as requiring any person to produce books, papers or records or to testify in response to any inquiry not pertinent to some question lawfully before such board or supervisor or commission or court for determination within the purposes of this act: *Provided further*, That any incriminating evidence, documentary or otherwise, shall not thereafter be used against such witness in a prosecution or action for forfeiture: *Provided further*, That no person testifying shall be exempted from prosecution and punishment for perjury in so testifying.

SEC. 10. In case of failure or refusal on the part of any person to comply with any subpoena issued by the supervisor, or on the refusal of any witness to testify or answer as to any matters regarding which he may be lawfully interrogated, any circuit court in this state, or any judge thereof, on applications of said supervisor, may issue an attachment for such person and compel him to comply with such subpoena and to attend before the board or supervisor and produce such documents, and give his testimony upon such matters, as may be lawfully required and such court or judge shall have the power to punish for contempt as in case of disobedience of a like subpoena issued by or from such court, or a refusal to testify therein.

Any witness summoned by subpoena or by written request of the supervisor and attending any hearing called by the supervisor shall be entitled to the same fees and mileage as are or may be provided by law for attending the circuit court in any civil matter or proceeding. The fees and mileage of witnesses subpoenaed at the instance of the supervisor or the board shall be paid out of the general funds of the state treasury upon proper voucher approved by the supervisor. The fees and mileage of witnesses subpoenaed at the instance of any other interested parties shall be paid by such other parties.

SEC. 11. If any person of whom an oath shall be required under the provisions of this act, or by any rule, regulation or order of the supervisor, shall wilfully swear falsely in regard to any matter or thing respecting which such oath is required, or shall wilfully make any false affidavit required or authorized by the provisions of this act, or by any rule, regulation or order of the supervisors, such person shall be deemed guilty of perjury and shall be punished by imprisonment in the state penitentiary for not more than 5 years nor less than 6 months.

SEC. 12. Whenever to prevent waste, as defined herein, the supervisor limits the amount of oil to be produced from any pool or field in this state, he shall, after consulting with the board and considering its recommendations, allocate or distribute the allowable production in any such field or pool. Such determination or distribution in such field or pool shall be made on a reasonable basis, giving, if reasonable, under all circumstances, to each small well of settled production in such pool or field, an allowable production which will prevent a general or premature abandonment of the wells in such pool or field.

SEC. 13. Whenever, to prevent waste, the total allowable production for any field or pool in the state is fixed in an amount less than that which the field or pool could produce if no restriction were imposed, the supervisor, after consulting with the board and considering its recommendations, shall prorate or distribute on a reasonable basis the allowable production among the producing wells in the field or pool, so as to prevent or minimize reasonably avoidable drainage from each developed area which is not equalized by counter drainage. The rules, regulations, or orders of the supervisor shall, so far as it is practicable to do so, afford the owner of each property in a pool the opportunity to produce his just and equitable share of the oil and gas in the pool, being an amount, so far as can be practicably determined and obtained without waste, and without reducing the bottom-hole pressure materially below the average for the pool, substantially in the proportion that the quantity of the recoverable oil and gas under such property bears to the total recoverable oil and gas in the pool, and for this purpose to use his just and equitable share of the reservoir energy: *Provided*, That a well in a pool producing from an average depth of 1,000 feet or less, shall, on the basis of a full drilling unit as may be established under this section, be given a base allowable production of at least 100 barrels of oil per well per week; for a well in a pool producing from an average depth greater than 1,000 feet, the base allowable production shall be increased 10 barrels per well per week for each additional 100 feet of depth greater than 1,000 feet: *Provided further*, That such allowable production is or can be made without surface or underground waste, as defined herein.

To prevent the drilling of unnecessary wells the supervisor, after conference with and recommendation by the board, may fix a drilling unit for each pool, such being the area which may be efficiently and economically drained and developed by 1 well, except in those pools which, prior to the effective date of this act, have been developed to an extent and where conditions are such that it would be impracticable or unreasonable to require a drilling unit at the present stage of development. A drilling unit, as contemplated herein, means the maximum area which may be efficiently and economically drained by 1 well and such unit shall constitute a developed area as long as a well is located thereon which is capable of producing the economically recoverable oil thereunder.

The drilling of unnecessary wells is hereby declared waste as such wells create fire and other hazards conducive to waste, and unnecessarily increase the production cost of oil and gas to the operator, and thus also unnecessarily increase the cost of the products to the ultimate consumer.

The pooling of properties or parts thereof shall be permitted, and, if not agreed upon, the supervisor after conference with and recommendations by the board, may require such pooling in any case when and to the extent that the smallness or shape of a separately owned tract or tracts would, under the enforcement of a uniform spacing plan or proration or drilling unit, otherwise deprive or tend to deprive the owner of such tract of the opportunity to recover or receive his just and equitable share of the oil and gas and gas energy in the pool: *Provided*, That the owner of any tract that is smaller than the drilling unit established for the field, shall not be deprived of the right to drill on and produce from such tract, if same can be done without waste, but in such case, the allowable production therefrom as compared with the allowable production if such tract were a full unit, shall be in the ratio of the area of such tract to the area of a full unit, except as a smaller ratio may be required to maintain average bottom-hole pressures in the pool, to reduce the production of salt water, or to reduce an excessive gas-oil ratio. All orders requiring such pooling shall be upon terms and conditions that are just and reasonable, and will afford to the owner of each tract in the pooling plan the opportunity to recover or receive his just and equitable share of the oil and gas and gas energy in the pool as above provided, and without unnecessary expense, and will prevent or minimize reasonably avoidable drainage from each developed tract which is not equalized by counter drainage. The portion of the production allocated to the owner of each tract included in a drilling unit formed by voluntary agreement or by a pooling order shall, when produced, be considered as if had been produced from such tract by a well drilled thereon.

Each well permitted to be drilled upon any drilling unit or tract shall be drilled approximately in the center thereof with such exception as may be reasonably necessary where it is shown, after notice and upon hearing and the supervisor finds that the unit is partly outside the pool, or for some other reason, a well approximately in the center of the unit would be unproductive, or that the owner or owners of a tract or tracts covering the central part of such unit refuses to permit drilling in or near the center of the unit, or where topographical or other conditions are such as to make drilling approximately in the center of the unit unduly burdensome or imminently threatening to water or other natural resources, or property or life.

Whenever any exception is granted the supervisor shall take such action as will offset any advantage which the person securing the exception may have over other producers in the pool by reason of the drilling of the well as an exception, and so that drainage from the developed areas to the tract with respect to the exception granted will be prevented or minimized and the producer of the well drilled as an exception will be allowed to produce no more than his just and equitable share of the oil and gas in the pool as such share is set forth herein, and to that end the rules, regulations and orders of the supervisor shall be such as will prevent or minimize reasonably avoidable drainage from each developed area which is not equalized by counter drainage and will give to each producer the opportunity to use his just and equitable share of the reservoir energy.

Minimum allowable for some wells and pools may be advisable from time to time, especially with respect to wells and pools already drilled when this act takes effect, to the end that the production will repay reasonable lifting costs and thus prevent premature abandonment of wells and resulting wastes.

After the effective date of any rule, regulation or order made by the supervisor in accordance with and under the provisions of this act fixing the allowable production, no person shall produce more than the allowable production applicable to him, his wells, leases or properties, and the allowable production shall be produced in accordance with such applicable rules, regulations or orders

SEC. 14. The supervisor shall have authority to issue certificates of clearance or tenders whenever the same may be required to effectuate the purposes of this act.

SEC. 15. It shall be unlawful for any person to sell, purchase, acquire, transport, refine, process or otherwise handle or dispose of any illegal oil in whole or in part, or any illegal product of oil: *Provided*, That no penalty nor forfeiture shall be imposed on account of any such act until certificates of clearance or tenders have been required by the supervisor as provided in section 14 hereof.

SEC. 16. No rules, regulations or orders shall be made, promulgated, put into effect, revoked, changed, renewed or extended except emergency orders hereinafter provided for until and unless public hearings shall be held thereon. Public hearings shall be held at such time, place and manner and upon such notice, not less than 10 days, as shall be prescribed by general order and rules adopted in conformity with this act The supervisor shall have authority to promulgate and put in effect emergency rules, regulations or orders without a public hearing that may be necessary to carry out the provisions of this act: *Provided*, That such emergency rules, regulations and orders shall in no event remain in force and effect more than 21 days.

SEC. 17. The circuit court of Ingham county shall have exclusive jurisdiction of all suits brought against the commission, the supervisor, the board or any agent or employee thereof, by or on account of any matter or thing arising under the provisions of this act. No temporary restraining order or injunction shall be granted in any such suit except after due notice and for good cause shown.

SEC. 18. The supervisor shall have power to bring proceedings at law or in equity for the enforcement of the provisions of this act and all rules and regulations promulgated thereunder or for the prevention of the violation thereof, and the attorney general shall represent the supervisor in all actions brought under this act. The circuit court of Ingham county shall have concurrent jurisdiction thereof.

SEC. 19. Any person who, for the purpose of evading this act, or of evading any rule, regulation or order made hereunder, shall intentionally make, or cause to be made, false entry or statement of fact in any report required by this act or by any rule, regulation or order made hereunder, or who, for such purpose, shall make or cause to be made false entry in any account, record, or memorandum kept by any person in connection with the provisions of this act, or of any rule, regulation or order made thereunder; or who, for such purpose, shall omit to make, or cause to be omitted, full, true, and correct entries in such accounts, records, or memoranda, of all facts and transactions pertaining to the interest or activities in the petroleum industry of such person as may be required by the supervisor under authority given in this act or by any rule, regulation or order made hereunder; or, who, for such purpose, shall remove out of the jurisdiction of the state, or who shall mutilate, alter, or by any other means falsify any book, record, or other paper pertaining to the transactions regulated by this act, or by any rule, regulation or order made hereunder; shall be deemed guilty of a felony and shall be subject, upon conviction in any court of competent jurisdiction, to a fine of not more than $1,000.00, or imprisonment for a term of not more than 3 years, or to both such fine and imprisonment.

SEC. 20. Except as penalty is herein otherwise especially provided for, any person who violates any provision of this act or any rule, regulation or order promulgated hereunder shall be subject to a penalty of not exceeding $1,000.00 and each day that violation shall continue shall constitute a separate offense. Said penalty shall be recovered by suit brought by the supervisor.

Any person aiding or abetting in the violation of any provision of this act, or any rule, regulation or order made thereunder, shall be subject to the same penalties as are prescribed herein.

Sec. 21. All illegal oil and products derived from illegal oil and conveyances used in the transportation thereof and containers used in the storage thereof except railroad tank cars and oil pipe lines shall be subject to confiscation and the supervisor is hereby empowered and authorized to seize such illegal oil, illegal oil products, conveyances and containers. The supervisor shall immediately upon such seizure institute a proceeding in rem to confiscate said illegal oil, illegal oil products, conveyances, and containers in the circuit court of the county in which such seizure was made or in the circuit court of Ingham county. Upon commencement of such proceedings such notice shall be given to all known interested persons in such manner as the court shall direct. The court, upon finding that said oil or said oil products or said conveyances or containers so seized are illegal as herein defined, shall order the same to be sold under such terms and conditions as it may direct. Any person claiming an interest in any oil or oil product or conveyance or container so seized shall have the right to intervene in said proceedings and the rights of such person shall be determined by the court as justice may require.

Sec. 22. A privilege fee of one-eighth of 1 cent per barrel shall be paid upon oil produced in Michigan and sold. This fee shall be levied and collected by the Michigan tax commission in the same manner as provided in and by Act No. 48 of the Public Acts of 1929, of the state of Michigan. All moneys received from this source shall be turned in to the general fund of the state.

Sec. 23. No person shall drill or begin the drilling of any well for oil and gas or for geological information or any well drilled as a key well in secondary repressuring by gas, air, or water method, or a well for the disposal of salt water, brine, or other oil field wastes, which are classed as non-productive wells, until the owner directly or through his authorized representatives shall have first made a written application to drill any such well and filed with the supervisor a satisfactory surety bond as provided in section 6 of this act, and received and posted in a conspicuous place at the location of the well a permit in accordance with the rules, regulations, and requirements or orders made and promulgated by the supervisor. A fee of $25.00 shall be charged for a permit to drill a well for oil and gas and a fee of $1.00 for a permit to drill a well for geological information or to drill a key well or disposal well. Upon receiving such written application and payment of the fee required, the supervisor shall within 5 days thereafter issue to any owner or his authorized representative, a permit to drill such well: *Provided, however,* That no permit to drill a well shall be issued to any owner or his authorized representative who does not comply with the rules, regulations, and requirements or orders made and promulgated by the supervisor: *And provided further,* That no permit shall be issued to any owner or his authorized representative who has not complied with or is in violation of this act, or any of the rules, regulations, requirements or orders issued by the supervisor, or the department of conservation.

The supervisor shall thereupon pay such permit fee into the state treasury and it shall there be credited to the general fund of the state.

All information and records with reference to the issuance of permits for the drilling of any core or test well or for geological information including the permit, shall be held confidential for 6 months after completion of such well, and shall not be open for public inspection during that time.

Sec. 24. This act shall be cumulative of all existing laws on the subject matter, but, in case of conflict, this act shall control and shall repeal such conflicting provisions. Act No. 15 of the Public Acts of 1929, as amended, being sections 5696 to 5712, inclusive, of the Compiled Laws of 1929, is hereby repealed.

Sec. 25. The provisions of this act are declared to be severable, and if any section or part thereof be held unconstitutional or invalid for any reason, it is hereby declared to be the legislative intent that the remaining provisions of this act would have been enacted without such section or part held to be invalid having been included therein.

Sec. 26. Nothing contained in this act shall prevent exploration for the discovery of new pools by the drilling of so-called wildcat wells as now authorized by law, but in the event oil or gas production is obtained, then said new pool and the well or wells drilled therein shall be subject to this act.

Sec. 27. The provisions of this act shall not apply to drill holes for the exploration and the extraction of iron, copper, or brine, to water wells, to mine and quarry drill and blast holes, nor to coal test holes, nor to seismograph or other geophysical exploration test holes.

This act is ordered to take immediate effect.

GENERAL RULES AND REGULATIONS GOVERNING OIL AND GAS OPERATIONS IN THE STATE OF MICHIGAN

Pursuant to the provisions of Act No. 61 of the Public Acts of Michigan 1939, the following rules and regulations are hereby issued and adopted, to become effective on and after June 15, 1939.

Unless the context requires a different meaning, the trade words and other words used in these rules shall have the same meaning as defined in section 2 of Act No. 61 of the Public Acts of Michigan 1939.

DRILLING

1. *Permits.*—No person shall drill or begin the drilling of any well for (1) oil or gas; (2) for geological information; (3) as a key well for secondary recovery methods; (4) for the disposal of salt water, brine, or oil field wastes, until the owner, or his authorized representatives, shall have received and posted in a conspicuous place at the well location a written permit to drill such well.

To obtain a permit the following requirements must be complied with:

(*a*) The person seeking the permit must completely and accurately fill out, sign, and file a written application on forms prescribed by the Supervisor.

(*b*) File a surety bond, as hereinafter provided.

(*c*) Pay a permit fee of twenty-five ($25.00) dollars for an oil or gas well or a permit fee of one ($1.00) dollar for a geological well, key well, or a disposal well.

NOTE.—No permit shall be issued to any owner, or his authorized representative, who does not comply or has not complied with, or is in violation of the law of this State, or the rules, regulations, or orders issued by the supervisor or the department of conservation.

2. *Transfer of Permits.*—No person to whom a permit has been issued shall transfer the permit to any other location or to any other person until the following requirements have been complied with:

1. If, prior to the drilling of a well, the person to whom the permit was originally issued desires to change the location, he shall submit a letter so stating and another application properly filled out showing the new location. No additional fee is necessary but drilling shall not be started until the transfer has been approved by the Supervisor and the new permit posted at the well location.

2. If, while a well is drilling or after it has been completed, the person to whom the permit was originally issued disposes of his interest in the well he shall submit a written statement to the Supervisor setting forth the facts and requesting the permit to be transferred to the person who has acquired the well.

Before the Supervisor shall recognize the transfer or change his records, the person who has acquired the well must submit a written statement setting forth that he has acquired the well and assumes the full responsibility for its operation and abandonment in conformity with the law, rules, regulations, and orders issued by the Supervisor and files the required surety bond, in the event he does not have one on file.

3. *Surety Bonds.*—Every person, owner, or producer who drills an oil or gas well shall file a surety bond with the Suprvisor on a form approved by the Supervisor which has been executed by a responsible surety company authorized to do business in the State of Michigan. The liability on the bond is conditioned on compliance with the law, rules, regulations, or orders of the Supervisor, and it shall continue until the well, or wells, are abandoned and completely plugged and the plugging approved by the Supervisor, or his authorized representative, and all logs, plugging records, or other pertinent information required by law, or the rules, regulations, or orders of the Supervisor have been filed withhim.

1. In the event that the person, owner, or producer shall be in default in any particular relative to the condition or conditions of the bond the Supervisor in that event shall look to the surety for immediate compliance and fulfillment of the full conditions thereof and all expense in connection therewith shall be paid by the principal or surety.

2. The person, owner, or producer, may file a bond for a single well in the amount of $1,000.00 or a blanket bond for all wells in the amount of $2,500.00.

The supervisor will advise the surety on any bond when its liability under a bond may be formally terminated.

4. *Approved Methods of Preventing Waste To Be Used.*—Any person drilling for or producing crude oil or piping oil for any purpose, shall use every possible precaution in accordance with the most approved methods to stop and prevent waste of oil or gas, or both, in drilling and producing operations, storage, or in piping or distributing the same.

5. *Pits for Drill Cuttings.*—There shall be provided at every well before the actual drilling has been started not less than two (2) pits of adequate and approved size for holding the drill cuttings removed from the well. Into one of the pits shall be deposited only the clay or soft shale cuttings suitable for making a heavy mud-laden fluid to confine oil, gas, or water to their native strata.

6. *Casing and Sealing Off Formations.*—Every person, owner, or producer who drills or causes to be drilled a well shall case and seal off each oil, gas, brine, or fresh water stratum above the producing horizon to effectively prevent the migration of oil, gas, brine, or fresh water to other strata.

Such casing and sealing off shall be effected and tested in such manner and by such methods and means as may be prescribed or approved by the supervisor or his authorized representative.

When necessary to permanently seal off any oil, gas, brine, or fresh water the amount of material to be used shall be specified or approved by the supervisor or his authorized representative.

7. *Well Head Equipment.*—No well shall be drilled into any formation known likely to contain oil or gas until the innermost string of casing shall have been equipped with a high pressure master gate valve and a control head and oil saver and securely anchored.

8. *Steel Line Measurements.*—The depth to the top of key formations and to all casing points should be determined by the use of steel measuring line, if possible.

9. *Well Records.*—Every person, owner, or producer who drills a well shall keep and preserve at the well being drilled accurate records of the drilling, redrilling, or deepening of the well, showing all formations penetrated, casing used, and other pertinent information as may be required by the supervisor in connection with the drilling of the well. All such information shall be available to the supervisor, or his authorized representative, at all times. Such records shall be protected from damage or destruction from any cause whatsoever.

10. *Samples of Drill Cuttings.*—When requested by the supervisor, or his authorized representative, every person, owner, or producer who drills a well shall take and preserve adequate samples of drill cuttings or any fluids encountered.

11. *Well Log To Be Filed.*—Every person, owner, or producer, who drills a well shall file with the supervisor within thirty (30) days after the first completion of a well a complete log or record of the well duly signed on forms prescribed by the Supervisor. This shall be done although samples of the drill cuttings have been taken and saved.

If requested by the person, owner, or producer in writing addressed to the supervisor, the log shall be kept confidential for a period of ninety (90) days after completion.

12. *Deepening.*—Every person, owner, or producer who desires to deepen a well to a depth below that which it was originally drilled shall file a written notice of intention to deepen with the Supervisor. The notice shall set forth in detail the new proposed total depth, the plan for sealing off any oil, gas, brine, or fresh water strata to be found or expected to be found in the deepening. If the method set forth is satisfactory and the person, owner, or purchaser is not in violation of the law or the rules of the Supervisor, and he has a satisfactory surety bond, the Supervisor shall issue a deepening permit. The actual deepening shall not be started until the deepening permit has been posted at the well location.

13. *Producing from different strata through the same casing string.*—No well shall be permitted to produce either oil or gas from different strata through the same string of casing without first receiving written permission from the Supervisor which shall be given only after a full and complete presentation of all the facts and reasons for so doing. Therefore, if a stratum should be encountered bearing either oil or gas and it is desired to drill deeper in search of other oil or gas bearing formations, the stratum first penetrated and likewise each and every formation in turn shall be closed and sealed separately to prevent waste, either surface or underground.

14. *Location and spacing of wells.*—The following are the requirements for the location and spacing of wells drilled for oil:

A. The minimum drilling unit for oil in Michigan shall be a ten-acre tract and shall conform to one of the quarters of each forty in each governmental survey section of land, allowance being made for the differences in the shape and size of the sections in accordance with the official survey plats of the United States Surveyor General.

B. No permit shall be granted for the drilling of an oil well unless the location be at least 330 feet from an adjoining lease or property line and unless the location be 660 feet from an adjacent or adjoining well and that no permit shall be be granted for a well to be drilled for oil on a tract of land less than ten acres, except that, when topographical or other conditions do not permit the locating of wells in this manner, reasonable allowances may be made.

In the event an application is made for a permit to drill for oil on a tract of substantially less than ten acres, and lying wholly or partly within a drilling unit, the person applying for the permit shall submit a certified statement that he refuses to pool his acreage within such drilling unit with that of other lease owners in such unit as may be permitted or required in section 13 of the act No. 61, P. A. 1939, or that the attempt to pool said lease or tract or part thereof with those of other lease owners in the unit has failed. In that event such person may be granted a permit to drill for oil on such tract or part thereof, but the location of the well shall be approximately in the center of his acreage within the drilling unit, subject, however, to the exceptions and conditions provided in section 13, Act No. 61, P. A. 1939.

PRODUCTION

1. *Use of earthen reservoirs.*—Oil shall not be stored or retained in earthern reservoirs or in open receptacles.

2. *Disposal of brine or salt water.*—Brine or salt water produced in the drilling for or the production of oil shall not be run to earthen reservroirs or ponds, except for such reasonable time and under conditions as may be approved by the Supervisor, or his authorized representative, after which it must be returned to some underground formation or otherwise disposed of as approved by the Supervisor where it cannot do damage to any fresh water, oil, gas, or other minerals.

3. *Use of natural gas.*—Natural gas in its natural state shall not be used in engines, pumps, or for the blowing of wells, where its natural pressure is the main or direct operating force unless the exhaust or discharge is properly conserved.

4. *Use of vacuum pumps.*—Vacuum pumps or other devices shall not be used for the purpose of creating a partial vacuum in any formation producing or capable of producing oil, except upon written permission of the Supervisor.

5. *Production of carbon black.*—The production of carbon black within the State of Michigan by the process of burning natural gas is prohibited, except on written approval of the Supervisor.

6. *Tubing and Producing of Flowing Wells.*—Each flowing well shall be tubed immediately, and if not tubed within five days after commencement of flow, the well will be shut in. All flowing wells must be produced through tubing which shall not exceed two and one-half (2½) inches in diameter. Provided, however, that where it is shown from the written petition filed by the producer and from the investigation made by the Supervisor or his authorized representative that the well or wells involved have such high gas pressure or large oil-producing capacity that the immediate tubing of such well or wells would place the persons tubing same in imminent danger of their lives or injury to their persons, or result in waste or great property damage, the Supervisor may grant a reasonable extension or extensions of time to tube such well or wells.

PLUGGING AND ABANDONING WELLS

1. *Notice of intention to abandon.*—No person, owner, or producer shall begin to plug or abandon any well until he shall have first filed with the Supervisor, or his authorized representative, on forms prescribed by the Supervisor, a notice of intention to abandon the well and received permission to proceed with the necessary work.

The notice shall give a detailed statement of:

(*a*) The present condition of the well including size and lengths of all casings, depth to the top of all formations, depths where water, oil, or gas were encountered, total depth, and any other pertinent information.

(*b*) A detailed statement of the proposed work, including the length and depth of plugs, plans for mudding, cementing, and removing casing.

(*c*) The equipment to be used in plugging.

2. *When operations are to be started.*—Plugging operations on all dry or abandoned wells must start within fifteen (15) days after drilling or production operations cease and shall be prosecuted with diligence. The Supervisor, or his authorized representative ,may, if conditions warrant, grant an extension of the starting time.

3. *Method and material to be used in plugging.*—In plugging all oil, gas, or water shall be confined to the strata in which it occurs by the use of mud-laden fluid, cement, or by a combination of both, or by some other suitable material. The amount, type, and kind of mud-laden fluid, or other suitable material to be used

in plugging shall be prescribed or approved by the Supervisor, or his authorized representative, as well as the manner or method used in introducing the mud-laden fluid, cement, or combination of both, or other suitable material into the hole.

4. *Saving as fresh water well.*—When the landowner desires and agrees in writing to assume full responsibility that a well being plugged be saved as a fresh water well and the well may be safely used as such, the well need not be plugged above the bottom of the fresh water: Provided, that written authorization for such use be secured from the landowner and filed with the Supervisor and approved by the supervisor, or his authorized representative.

5. *Plugging records to be filed.*—Every person, owner, or producer who plugs a well shall file with the Supervisor within thirty (30) days after the plugging work is finished a complete record of the plugging work done, signed and sworn to on forms prescribed by the supervisor.

PREVENTION OF FIRES AND EXPLOSIONS, AND DANGER TO OR DESTRUCTION OF PROPERTY OR LIFE

1. *Well and tank locations to be cleared.*—(*a*) The area around every well drilling operation must be cleared of brush, slash, weeds, and other inflammable material for a radius of 75 feet. If conditions require, a fireline, at least 10 feet in width, must be constructed around the outer edge of the cleared area. Material resulting from clearing operations must be properly disposed of before the commencement of drilling operations.

(*b*) The area for a distance of 75 feet around all oil wells and storage tanks must be kept free of brush, slash, weeds, and any other material which creates or may create a fire hazard.

2. *Slush pits to be filled in.*—Slush pits at producing oil wells must be filled in within a reasonable time after the completion of the well.

3. *Safety signs.*—Safety signs, furnished by the Department of Conservation, shall be posted by the operator in conspicuous places around each drilling operation, producing well, and storage tank.

4. *Fire walls or dikes.*—All lease, stock, and oil storage tanks shall be protected by an approved fire wall or dike, which wall shall form a reservoir having a capacity one and one-half times the capacity of the enclosed tank or tank battery. Such tank or tank battery shall not be erected, enclosed, or maintained closer than 200 feet from any drilling or producing well or other oil storage tanks. The dikes must be maintained and the reservoir kept free of oil, emulsions, tank bottoms, brine, fresh water, vegetation, or any inflammable material.

5. *Handling waste oil and tank bottoms.*—Waste oil and tank bottoms must be collected in pits located not less than 100 feet from any oil well, lease, stock, or oil storage tank, and burned as often as necessary to prevent overflow. The area for a distance of 25 feet around these pits must be kept free of inflammable material. Waste oil and tank bottoms must be conveyed from the storage tanks to the pits in such a manner as will not create additional fire hazards or cause damage to or destruction of property. These pits shall not be used to collect production brine.

6. *Oil loss from pipe lines.*—Any oil which has escaped from an oil pipe line must be promptly burned, plowed under, covered over with sand, or otherwise properly disposed of. Every precaution must be taken to prevent the escape of oil from the immediate area. The lease owner shall be responsible for wastes from all lines from the well head to the storage tanks, and transportation agencies shall be responsible for wastes from all gathering and trunk lines.

7. *Supervisor to be notified of oil loss.*—All operators of drilling or producing wells, and all transportation agencies, shall notify the Supervisor of Wells or his authorized representative of fires which occur at oil wells, oil tanks, or pump stations owned, operated, or controlled by them; tanks struck by lightning; other fires which destroy oil and gas; breaks or leaks in tanks or pipe lines from which oil or gas escaped or is escaping; and serious accidents which have created or may create fire or cause damage to or destruction of property or life. Notification shall be made promptly by telephone or telegraph giving briefly the particulars, and by letter giving a more detailed account of events and conditions. Reports of fires, blow-outs, breaks, or leaks in tanks or pipe lines or other accidents shall specify the location of the well, tanks, booster pump, or pipe line, giving the quarter, section, township, and range in unplatted land, and the lot or portion thereof in platted land. However, no reports need be made of any loss of oil by leakage or breakage of tanks or pipe lines where the amount is less than twenty-five (25) barrels.

8. *Burning of gas.*—All gas produced in the operation of oil wells which is not utilized shall be burned so far as practicable or advisable. No gas shall be burned closer than one hundred (100) feet from any well or storage tank.

9. *Formation of emulsions to be reduced.*—The production and handling of crude oil shall be carried on in such manner as will reduce as much as practicable the formation of emulsions and tank bottoms. These substances and waste oil shall not be allowed to create unnecessary fire hazards; nor shall tank bottoms, emulsions, waste oil, or brine be allowed to enter streams, rivers, lakes, or any other fresh waters.

10. *Wells to be identified.*—Every well shall be identified by a sign, posted on the derrick, if possible, otherwise on a substantial post not more than twenty feet from such well, and such signs shall be of durable construction and the lettering thereon shall be kept in a legible condition and shall be large enough to be legible under normal conditions at a distance of fifty (50) feet. The wells on each lease or property shall be numbered consecutively beginning with No. 1, unless some other system of numbering was adopted by the owner prior to the adoption of these rules and regulations. Each sign shall show the number of the well, the name of the lease (which shall be different for each lease), the name of the lessee, owner, or operator, and the location by quarter, section, township, and range.

ENFORCEMENT

The Supervisor by virtue of Section 6 of Act 61, P. A. 1939, is specifically empowered to enforce all rules and regulations, issue orders and instructions necessary to enforce such rules and regulations, and to do whatever may be necessary with respect to the subject matter stated in the rules and regulations to carry out the purposes of the rules and regulations and of the act itself, whether or not such orders or instructions are indicated, specified, or enumerated in the act or in the rules and regulations.

PENALTIES

The penalties provided by Act No. 61, P. A. 1939, are as follows:

Section 19: "Any person who, for the purpose of evading this act, or of evading any rule, regulation, or order made hereunder, shall intentionally make, or cause to be made, false entry or statement of fact in any report required by this act or by any rule, regulation, or order made hereunder, or who, for such purpose, shall make, or cause to be made, false entry in any account, record, or memorandum kept by any person in connection with the provisions of this act, or of any rule, regulation, or order made thereunder; or who, for such purpose, shall omit to make, or cause to be omitted, full, true, and correct entries in such accounts, records, or memoranda, of all facts and transactions pertaining to the interest or activities in the petroleum industry of such person as may be required by the Supervisor under authority given in this act, or by any rule, regulation, or order made hereunder, or, who, for such purpose, shall remove out of the jurisdiction of the state, or who shall mutilate, alter, or by any other means falsify any book, record, or other paper pertaining to the transactions regulated by this act, or by any rule, regulation, or order made hereunder; shall be deemed guilty of a felony and shall be subject, upon conviction in any court of competent jurisdiction, to a fine of not more than one thousand ($1,000.00) dollars or imprisonment for a term of not more than three (3) years, or to both such fine and imprisonment."

Section 20: "Except as penalty is herein otherwise especially provided for, any person who violates any provision of this act, or any rule, regulation, or order promulgated hereunder, shall be subject to a penalty of not exceeding one thousand ($1,000.00) dollars and each day that violation shall continue shall constitute a separate offense. Said penalty shall be recovered by suit brought by the Supervisor.

"Any person aiding or abetting in the violation of any provision of this act, or any rule, regulation, or order made thereunder, shall be subject to the same penalties as are prescribed herein."

NOTICE

The foregoing rules and regulations supersede and take the place of any rules issued heretofore except those sections 2, 3, and 4 of the Emergency Rules and

Regulations effective June 1, 1939, as amended, having to do with the amount of oil which can be produced and the reporting of the oil produced in certain fields.

Signed, sealed, and ordered published this 9th day of June 1939.

P. J. Hoffmaster,
Supervisor of Wells.

Conservation Commission, by:

W. H. Loutit, *Chairman.*
Wayland Osgood, *Secretary.*

STATE OF MICHIGAN, DEPARTMENT OF CONSERVATION, SUPERVISOR OF WELLS

PRORATION ORDER NO. 3

Public hearings in the matter having been held, after due notice in each case, the last hearing having been held on September 6, 1939, and the Advisory Board having been consulted and having made its recommendations, all as provided for by Act No. 61 of the Public Acts of the State of Michigan 1939; and it having been found necessary to control production of oil in certain fields in the State of Michigan in order to prevent physical waste and imminent danger of further physical waste, the following proration order is hereby adopted, issued, and promulgated, to become effective on and after September 13, 1939:

This proration order supersedes proration orders Nos. 1 and 2, effective July 1, 1939, and August 12, 1939, respectively, and emergency proration order file No. 4, effective August 23, 1939, which together embodied all permanent and temporary proration orders previously issued by the supervisor.

Unless the context requires a different meaning, the trade words and other words used in this order shall have the same meanings as defined in section 2 of Act No. 61 of the Public Acts of the State of Michigan 1939.

1. *Amount of Oil Which Can Be Produced.*—In the pools or fields designated below, no person, owner, or producer shall produce or cause to be produced more oil per well per twenty-four (24) hour day per full drilling unit per lease than the amounts set opposite such designated pools or fields.

	Bbls.
Columbia—Columbia Twp., Van Buren County	100
New Salem—northern two (2) tiers of sections in Salem Twp., Allegan County, and any portion of Jamestown Twp., Ottawa County, into which the New Salem pool may be extended	100
Salem—Sections 13 to 24, inclusive, Salem Twp., Allegan County	100
Walker—Walker and Wyoming Twp., Kent County, and Tallmadge Twp., Ottawa County	100
Freeman-10 acre—Freeman and Redding Twps., Clare County	100
Redding-20 acre—Freeman and Redding Twps., Clare County	200

The production of oil is to be calculated on the basis of the daily average amount for each calendar month.

2. *Production from Wells Drilled on Tracts Less Than a Full Drilling Unit.*—Each producing well on a tract less than a full drilling unit, whether such unit be ten acres or twenty acres, shall produce only in the ratio of the area of such tract to the area of the full drilling unit in which such tract is located; Provided, However, That in order to prevent the premature abandonment of such well the allowable production shall not be fixed at less than twenty (20) barrels of oil per day, irrespective of the date of completion of such well.

3. *Production from Wells Drilled on Tracts More Than a Full Drilling Unit.*—A producing well located at the approximate center of a tract of more than a full drilling unit of ten (10) acres shall have an allowed production equal to the ratio of the acreage of the tract drilled on to that of a full drilling unit of ten (10) acres, provided that such allowable shall not be more than fifty (50) percent greater than the allowed production for a well on a full drilling unit of ten (10) acres.

4. *Reports of Oil Produced, Purchased, or Transported.*—Every person who is producing, purchasing, or transporting oil in the above-designated pools or fields shall report on or before the fifteenth day of each calendar month to the Supervisor of Wells at Lansing the amount of oil produced, purchased, or transported by him from each lease during the preceding calendar month. Such reports shall be on forms provided for the purpose by the Supervisor and shall be sworn to by such person or his authorized representative.

Penalties

The penalties provided by Act No. 61, Public Acts of 1939, are as follows:

Section 19: "Any person, who, for the purpose of evading this act, or of evading any rule, regulation, or order made hereunder, shall intentionally make, or cause to be made, false entry of statement of fact in any report required by this act or by any rule, regulation, or order made hereunder, or who, for such purpose, shall make or cause to be made false entry in any account, record, or memorandum kept by any person in connection with the provisions of this act, or of any rule, regulation, or order made thereunder; or who, for such purposes, shall omit to make, or cause to be omitted, full, true, and correct entries in such accounts, records, or memoranda, of all facts and transactions pertaining to the interest or activities in the petroleum industry of such person as may be required by the supervisor under authority given in this act or by any rule, regulation, or order made hereunder; or who, for such purpose, shall remove out of the jurisdiction of the state, or who shall mutilate, alter, or by any other means falsify any book, record, or other paper pertaining to the transactions regulated by this act, or by any rule, regulation, or order made hereunder, shall be deemed guilty of a felony and shall be subject, upon conviction in any court of competent jurisdiction, to a fine of not more than $1,000.00, or imprisonment for a term of not more than three years, or to both such fine and imprisonment."

Section 20: "Except as penalty is herein otherwise especially provided for, any person who violates any provision of this act or any rule, regulation, or order promulgated hereunder, shall be subject to a penalty of not exceeding one thousand ($1,000.00) dollars, and each day that violation shall continue shall constitute a separate offense. Said penalty shall be recovered by suit brought by the Supervisor.

"Any person aiding or abetting in the violation of any provision of this act, or any rule, regulation, or order made thereunder, shall be subject to the same penalties as are prescribed herein."

Signed, sealed, and ordered published this eighth day of September 1939.

P. J. HOFFMASTER,
Supervisor of Wells.

Approved:

CONSERVATION COMMISSION,
W. H. LOUTIT, *Chairman.*
WAYLAND OSGOOD, *Secretary.*

STATE OF MICHIGAN, DEPARTMENT OF CONSERVATION, SUPERVISOR OF WELLS

PRORATION ORDER NO. 4

After a public hearing on October 25, 1939, at which testimony was given on the matter of the amount of oil to be produced from the wells in the various prorated fields as set forth in Proration Order No. 3 and upon consultation with and recommendation by the Advisory Board, all as provided for by Act No. 61 of the Public Acts of the State of Michigan 1939, the following proration order is hereby adopted, issued, and promulgated to become effective on and after seven o'clock A. M., November 15, 1939:

This proration order supersedes file No. 5, emergency rules and regulations, effective November 1, 1939.

Unless the context requires a different meaning, the trade words and other words used in these rules and regulations shall have the same meaning as defined in section 2 of Act No. 61 of the Public Acts of the State of Michigan 1939.

1. *Amount of Oil which can be Produced.*—Section 1 of Proration Order No. 3, effective September 13, 1939, is amended by striking from the list of pools or fields designated therein the words: "Columbia—Columbia twp., Van Buren County—100 bbls." and "Salem—Sections 13 to 24 inclusive, Salem twp., Allegan County—100 bbls."

Signed, sealed, and ordered published this tenth day of November 1939.

P. J. HOFFMASTER,
Supervisor of Wells.

Approved:

CONSERVATION COMMISSION,
W. H. LOUTIT, *Chairman.*
WAYLAND OSGOOD, *Secretary.*

State of Michigan, Department of Conservation, Supervisor of Wells

PRORATION ORDER NO. 5

After a public hearing on January 22, 1940, at which testimony was given in the matter of the amount of oil to be produced without physical waste from the wells located in sections 27, 28, 34, 33, and 35, T. 4 N., R. 14 W., and sections 2, 3, and 4, T. 3 N., R. 14 W., Overisel and Heath townships, respectively, of Allegan County, and upon consultation with and recommendations by the Advisory Board, all as provided for by Act No. 61 of the Public Acts of the State of Michigan, 1939, the following proration order is hereby adopted, issued, and promulgated to become effective on and after seven o'clock A. M., February 1, 1940.

Unless the context requires a different meaning, the trade words and other words used in this order shall have the same meaning as defined in section 2 of Act No. 61 of the Public Acts of the State of Michigan, 1939.

1. *Amount of Oil Which Can Be Produced.*—Section 1 of Proration Order No. 3, effective September 13, 1939, is amended by adding to the list of pools or fields designated therein the following:

Overisel—Sections 27, 28, 33, 34, and 35, T. 4 N., R. 14 W., Overisel County, and sections 2, 3, and 4, T. 3 N., R. 14 W., Heath township—Allegan County—100 barrels.

Signed, sealed, and ordered published this 23rd day of January 1940.

P. J. Hoffmaster,
Supervisor of Wells.

STATEMENT OF MR. JAMES B. GRIFFITH, CHEYENE, WYO., COMMISSIONER OF PUBLIC LANDS FOR THE STATE OF WYOMING

Mr. Kelly. Mr. Griffith, we will hear you. You are commissioner of public lands for the State of Wyoming.

Mr. Griffith. Yes, sir. I will have a very short statement, Mr. chairman. I would like to leave this evening.

Mr. Chairman and gentlemen of the committee; I am commissioner of public lands for the State of Wyoming, with office in the State Capitol Building, at Cheyenne.

The State land board and the office of the commissioner of public lands was created by statute for the purpose of administering public lands of Wyoming, such as leasing the lands for grazing and agricultural purposes and for oil and gas prospecting, as well as for the prospecting and production of coal and other minerals. The board of land commissioners is composed of the five elective State officers, namely, Governor (who is chairman of the board), secretary of state, State auditor, superintendent of public instruction and State treasurer.

The commissioner of public lands—that is myself—is appointed by the Board and has general supervision of the department, which administers approximately 3,200,000 acres of State lands. Of these 3,200,000 acres, practically all is potential oil-producing lands.

For the purpose of conservation and to insure proper supervision over prospectors and producers of State lands, the office of State mineral supervisor has been created by statute. The mineral supervisor is under the direct supervision of the commissioner of public lands.

There are 26 proven oil and gas fields in the State of Wyoming. This mineral supervisor is required to visit all of them several times a year, traveling about 60,000 miles annually. He advises with drillers and drilling contractors in methods used; if a well comes in, he advises as to the best methods of production and such matters as storage, tank connections, et cetera, so as to prevent waste. If a well is a failure and is abandoned, he sees that it is properly plugged so there can be no possibility of water damage, either to the surface or sands underneath. He sees that there is no gas waste in particular. Every lessee of State lands for oil and gas prospecting is under adequate bond so that the State is amply protected against any kind of damage.

In the two largest oil-producing fields of the State the producing companies themselves have entered into an extensive re-pressuring program, whereby the natural gas is forced back into the ground under pressure, thus prolonging the life of the field and securing the ultimate recovery. In the Lance Creek, one of the newest fields in the State, upward of a quarter of a million dollars has been spent on a re-pressuring plant, which operates 24 hours a day. In the Salt Creek field, now on the decline, the same methods are being used to stimulate the wells and prolong the life of the field.

For many years the State has been building a permanent fund from the revenues derived from State lands. This fund has now reached a total of almost $25,000,000. The oil industry has contributed the major share of this fund. From a single section in the Salt Creek field (section 36) the State has received the sum of $10,775,166.40 in royalties from 1908 to and including 1939. The earnings from this permanent fund are distributed among the common schools of the State. To impair or jeopardize this fund would be a serious blow at the school system of our State.

In my opinion, there is no need for additional regulatory legislation on the part of the Federal Government, because the State of Wyoming is doing the job in an efficient and effective manner.

The sovereign State of Wyoming has performed a good job in managing its own affairs, particularly in administering its oil and public land matters. The State government has no bonded indebtedness and does not owe a dollar to anyone; its budget is in balance; we are living within our income; we have a State tax levy of only one and one-half mills and over $30,000,000 in cash and securities in the vault in the State treasurer's office at Cheyenne.

Mr. WOLVERTON. Is your State a member of the interstate oil compact commission?

Mr. GRIFFITH. No, sir; it is not.

Mr. WOLVERTON. Your State then did not participate in the meeting of that commission in August, last?

Mr. GRIFFITH. No, sir; it did not.

Mr. WOLVERTON. Therefore I assume your State took no action with reference to the shutting off of production of oil in August, last?

Mr. GRIFFITH. No, sir; we never have shut down.

Mr. WOLVERTON. I have before me records which would show that Louisiana shut off production on August 16; Oklahoma on August 15; Kansas on August 16; New Mexico on August 17; Texas on August 14; and Arkansas on August 16, and it would seem as if you were not among them.

Mr. GRIFFITH. No. We never have shut down. The large producing companies of the State have entered into a voluntary proration whereby they handle the matter very well themselves, without suggestion of my department.

Our main outlets—we have two large pipe lines completed in the last 2 years; one completed by the Continental Oil Co. from the Lance Creek field to Denver, and the other by the Stanolind Pipeline

Co. from Fort Laramie to Salt Lake. We have a very nice outlet for our oil and we are in a very good position. We produce about 60,000 barrels or about 65,000 barrels of oil a day.

Mr. Wolverton. Do you have deposits of shale in your State?

Mr. Griffith. We have quite a large shale area, but I do not believe it has ever been prospected. We have so much oil that very little attention has been paid to shale.

Mr. Wolverton. Has the State or any private individual conducted any studies with reference to the utilization of shale in the production of oil?

Mr. Griffith. I do not believe they have; no.

Mr. Kelly. All right; we thank you, Mr. Griffith.

Mr. Griffith. Thank you very much.

Mr. Kelly. Are there any other representatives of State regulatory boards who wish to be heard with a short statement this afternoon? If not, the committee will stand adjourned until 10 o'clock tomorrow morning.

(Thereupon, at 4:05 p. m., the committee adjourned until 10 o'clock the following morning, Thursday, February 8, 1940.)

PETROLEUM INVESTIGATION

THURSDAY, FEBRUARY 8, 1940

House of Representatives,
Subcommittee of the Committee on
Interstate and Foreign Commerce,
Washington, D. C.

The subcommittee met, pursuant to adjournment, in the committee room, New House Office Building, at 10 a. m., Hon. William P. Cole, Jr., presiding.

Mr. Cole. The committee will please be in order.

Yesterday it was announced that the Governor of Mississippi having sent a telegram, there would be no other appearance from representatives of the conservation commission of that State. Mr. Morse has asked to present a statement, and we will be glad to hear you at this time, Mr. Morse.

STATEMENT OF HUGH M'DONALD MORSE, STATE OIL AND GAS SUPERVISOR OF MISSISSIPPI

Mr. Morse. Mr. Chairman and members of the committee.

Mr. Cole. Mr. Morse, will you give your full name for the record.

Mr. Morse. Hugh McDonald Morse, State oil and gas supervisor of Mississippi.

Governor Johnson has authorized me to say that he hopes that this committee will make an adverse report on this bill, and further to explain that the State of Mississippi is preparing a first-class conservation bill to conserve our oil and that we are profiting by the mistakes made by other States in its preparation.

We have extended an invitation to the Bureau of Mines to give us the benefit of their experience and to make suggestions in connection with the preparation of what we hope will be a modern and a model conservation law.

The State of Mississippi is comparatively new in the production of oil though gas has been produced for a number of years. Our first gas in commercial quantities was produced in February of 1926 and up to the present time our gas production amounts to 98,000,000,000 cubic feet. This gas is not wasted but is used in commerce and has been and is controlled by adequate gas legislation since the enactment of a conservation measure adopted in 1932 as chapter 117 of the Laws of Mississippi and was amended in 1934 and again in 1936.

Oil was discovered in Mississippi for the first time on September 13, 1939, but be it noted that in anticipation of this discovery the last amendment to our conservation law, namely, chapter 305 of the laws of 1936, provided for the conservation of oil in a manner similar to that employed in the conservation of gas. The object and purpose of this amendment was, and its ultimate effect has been, the prevention of waste.

At the present time Mississippi has about 15 wells and a daily average production approximating 3,200 barrels. Our field has been effectively proven though exploration is in progress throughout a large area with the expectation that other fields shortly will be discovered. There has been an enormous stimulus to oil exploration and development in our State since the discovery of the Tinsley field and our State and its people are conscious of the importance of this growing industry. When the Tinsley field was discovered our laws were reexamined and under the authority which we were granted we proceeded to put into effect conservation measures which were in line with the best oil-field practices adopted in other States with conservation laws of a more elaborate nature than that rest on the statute books of our State. With the cooperation of operators we have established for the Tinsley field a 40-acre spacing pattern which has been adhered to and we have limited production to a figure which our information, from an engineering standpoint, leads us to believe is proper and conducive to the greatest ultimate recovery.

In connection with this statement I am introducing into the record a copy of General Order No. 1, applying to the Tinsley field in Yazoo County, Miss., dated September 25, 1939, and also a copy of the general rules and regulations promulgated by the State Oil and Gas Board of Mississippi, having to do with production practices, particularly in the Jackson gas field.

I referred a moment ago to the amendment of our gas statute providing for the conservation of oil. As this amendment is brief and not so complete as certain other recently enacted conservation laws in other States, the question has arisen as to the advisability of enacting a new and comprehensive statute on the subject in the State of Mississippi. A copy of our present laws is attached to this statement and filed in the record herewith. Our legislature is now in session for the first time since the discovery of oil in the State of Mississippi and will have before it for consideration a new and comprehensive statute modeled after the most successfully controlled States, modified by suggestions which may be made by the Bureau of Mines and sponsored by our Governor, the Honorable Paul B. Johnson, in accordance with his inaugural address of January 16, 1940, and the message which I have transmitted to you.

Our position with respect to the Cole bill is that so far as Mississippi is concerned conservation of our natural resources of oil and gas is an accomplished fact under present legislation. We are in the era of early development of oil and with it we propose to improve our legislation and enlarge our staff of enforcement officers, engineers, and equipment, to keep pace with the growth of the industry. We feel that we are competent to meet all reasonable demands for the control of production without waste and that Federal legislation on the subject is unnecessary. The position of our Governor and the oil and gas board, and, we believe, the people of our State, is one of complete opposition to any form of Federal legislation on the subject.

The State Oil and Gas Board of Mississippi is composed of the Governor, Hon. Paul B. Johnson; the attorney general, Hon. Greek

L. Rice; the State land commissioner, Hon. Guy McCullum, and myself, as supervisor.

The Governor's absence from this hearing is due to the urgent necessity of his attendance on his State legislature, which is now in session, though he came to New Orleans for the hearing scheduled there. Our attorney general was likewise at New Orleans and now is ill at home, otherwise he would be in attendance on these hearings.

Mr. COLE. Mr. Morse, the committee had the pleasure of meeting your Governor and attorney general while in New Orleans, and would but for the untimely death of Mr. Mapes, have had the pleasure of hearing the Governor personally.

At the last session of your legislature you attempted to enact a more comprehensive law such as you say the purpose of the Governor is to have passed at the session just convened.

Mr. MORSE. Yes, sir; it is.

Mr. COLE. You were not successful in trying to pass the law at the last session, were you?

Mr. MORSE. No, sir.

Mr. COLE. Are there any very great changes between the existing law or the law to which you referred, and the proposed new statute?

Mr. MORSE. No, sir. There will be very little change in the law, mainly clarifying it.

In our old law we have regulations written into the law itself and so we are going to eliminate some of the regulations and make changes with reference to the regulatory body.

Mr. COLE. All right, sir. We thank you.

Mr. MORSE. Thank you.

(The matter submitted for the record above referred to is as follows:)

MISSISSIPPI OIL & GAS CONSERVATION LAW

(Being chapter 117, laws of 1932, as amended by chapter 154, laws of 1934, and chapter 305, laws of 1936)

AN ACT To conserve crude oil or petroleum and gas; to create a State Oil and Gas Board; to provide for the appointment of a State Oil and Gas Supervisor; to fix his salary, and the compensation of members of the Board; to provide for the appointment and selection of agents and employees to administer and enforce the provisions of the act; to authorize such Board to promulgate rules and regulations for the enforcement of the provisions of the act, and to conserve oil and gas; to regulate the production thereof; to provide penalties for the violation of the provisions of the act or the regulations promulgated thereunder; to repeal all laws in conflict therewith, and for other purposes.

SECTION 1. *Be it enacted by the Legislature of the State of Mississippi*, That there is hereby created and established a Board to be known as the State Oil and Gas Board, to be composed of the Governor, the Attorney General, the State Land Commissioner, and a State Oil and Gas Supervisor who shall be appointed by the Governor for a term of four years by and with the consent of the Senate.

SECTION 2. *Qualifications of State Supervisor and Members of the Board.*—The State Oil and Gas Supervisor shall be a competent petroleum engineer or geologist with at least five years experience in the development and production of oil and gas, or a competent and experienced oil operator having had not less than five years actual experience in the oil and gas fields. The Supervisor shall not be actively engaged or interested in the production or transportation of crude oil, or petroleum, or natural gas, nor shall he be financially interested directly or indirectly, in the purchase or ownership in any oil or gas well, drilling or producing, or in any oil or gas leases, or royalties while holding the office of State Oil and Gas Supervisor of the State of Mississippi.

SECTION 3. *Compensation of Supervisor and Members of the Board.*—The Supervisor shall receive a salary not to exceed Three Thousand Dollars ($3,000.00) per annum, shall be furnished a suitable office in the city of Jackson, and, in addition thereto, there shall be appropriated biennially, a sum sufficient to cover reasonable expenses incurred in an economical administration of the office. The State Oil and Gas Supervisor, before entering upon the duties of the office, shall take, subscribe, and file in the office of the Secretary of State, the oath of office prescribed by the Constitution and shall file a certificate thereof, whereupon a commission shall be issued to him. The said Oil and Gas Supervisor shall execute bond in the penal sum of Ten Thousand Dollars ($10,000.00), approved and conditioned according to law, before entering upon the discharge of his duties.

SECTION 4. *Duties of State Supervisor.*—The State Oil and Gas Supervisor shall be charged with the duty of enforcing this Act and all rules and regulations promulgated by said Board and he shall devote his entire time to the performance of his official duties.

SECTION 5. *Powers of the Board.*—(a) The Board hereby created shall have authority to adopt and promulgate such rules and regulations as may be reasonable and proper and as it may deem necessary for the conservation of crude oil or petroleum and/or natural gas produced in the State of Mississippi and to provide such rules and regulations for the drilling, development, sinking, deepening, abandonment, and operation of oil and gas wells as may be necessary to prevent the waste of such products and to protect the common source of supply. Provided, that any person, firm, association, or corporation affected by or interested in any act, order, rule, or regulation of the Board or of the Supervisor may file a petition with the Board for a hearing on such act, order, rule, or regulation and upon the filing of such petition for a hearing it shall be the duty of the Board to thereupon set a day not less than five nor more than fifteen days from the date of filing of such petition for a hearing. All hearings before the Board shall be in open session and all interested persons and their witnesses shall be heard. All decisions of the Board upon such petitions shall be made in writing and a copy served upon the petitioners; and any person, firm, association, or corporation being a party to such petition may appeal from the decision of the Board within ten days from the date of the rendition of the decision to the Circuit Court of Hinds County or of the county in which the petitioner is engaged in business or drilling operations. On the filing of a petition for appeal to the Circuit Court with the Board it shall be the duty of the Board to file a copy of the petition and order appealed from with the Clerk of the Circuit Court to which the appeal is taken and the matter shall be tried de novo by the Circuit Court and the Circuit Court shall have full authority to approve or disapprove the action of the Board. Appeals may be taken from the Circuit Court as allowed by law.

(b) The Board shall keep a written record of all its actions and the record shall show the vote of each member on all matters. This record shall be open to public inspection and all rules and regulations promulgated by the Board shall be printed and published.

(c) All necessary field and office assistants shall be employed by the Board and may be removed at any time by the said Board.

SECTION 6. *Quorum.*—Two members of the Board shall constitute a quorum, but two affirmative votes shall be necessary for the adoption or promulgation of any rule or regulation of the Board.

SECTION 7. *Waste Prohibited.*—The production of gas, crude oil, or petroleum in the State of Mississippi, in such manner and under such conditions as to constitute waste, is hereby prohibited.

SECTION 8. *Waste Defined, Protection.*—That the term "waste" as used herein in addition to its ordinary meaning, shall include underground waste, surface waste, and waste incident to the production of gas, crude oil, or petroleum. The State Oil and Gas Board shall have authority to make rules and regulations for the prevention of such wastes, and for the protection of all fresh water strata, and oil and gas bearing strata, encountered in any well drilled for oil or natural gas.

SECTION 9. *Production Regulated—Discrimination of Purchaser Prohibited.*—(a) The term "common source of supply" as used in this act shall mean any oil or gas field or part thereof which comprises and includes any area which is underlaid, or which from geological or other scientific data or experiments or from drilling operations or other evidence, appears to be underlaid, by a common pool or accumulation of oil or gas. The term "waste" as used in this act shall, in addition to the definition in section 8 of this act, include the production of natural gas in excess of transportation or market facilities or reasonable market demand.

(b) It shall be the duty of the board to prorate and regulate the gas well production from each common source of supply in the manner herein provided, for the protection of public and private interests, and to adjust the correlative rights and opportunities of each owner of gas in a common source of supply to produce, use, or sell such gas. The board shall exercise said authority when the aggregate lawful production capacity of all gas wells located in a common source of supply is in excess of the reasonable market demand for gas from gas wells located therein.

The limitation on production imposed by this section for the purpose of equitable proration among wells is in addition to the limitation imposed by sections 38 and 39 of this act.

(c) On or before the twentieth day of each calendar month, the board shall determine, as nearly as possible, the volume of gas from such common source of supply that will be produced from gas wells therein during the following month (from the twenty-sixth day of one calendar month to the twenty-fifth day of the next, both inclusive) to meet market demands and to be utilized as permitted by this act. Thereupon, the board shall allocate to each gas well producing gas from such common source of supply a percentage of such volume of gas to be produced from such common source of supply which may be produced during such month by such well. Such percentage, or the number of cubic feet of gas represented thereby, shall be the allowable production of such well for such month. On or before said twentieth day of each month the board shall make a proration order fixing the allowable production of each well in such common source of supply for the following month, and shall make the same public. In such order the board shall allocate, distribute, or apportion the total expected production from such common source of supply among the various gas wells affected by the order on a reasonable basis, and as provided in this section.

(d) In determining the allowable production of each well, the board shall take into account equally the acreage of the tract on which the well is located and the open-flow capacity of the well. However, the board shall not take into account the acreage of the tract on which such well is located in excess of the efficient drainage area of such well, which shall be determined by the board. In the event the board finds that the owner of any gas well has failed or refused to utilize or sell the allowable production from his well when such owner has been offered a connection or market for such gas at a reasonable price, such well shall be excluded from consideration in allocating the allowable production from the common source of supply in which said well is located until the owner thereof signifies to the board his desire to utilize or sell such gas. In all other cases all gas wells located in the common source of supply shall be taken into account in allocating the allowable production among wells therein, except that the board may, in the exercise of a reasonable discretion, determine when a new well, not yet actually marketing gas, or a well which is shut down for repairs, or other causes, shall be included or excluded in allocating said allowable production. In making proration orders the board may, where necessary, make adjustments between wells for the purpose of preventing waste. If in any month or months any well or wells shall actually produce more or less than the allowable production for such month or months as fixed by proration order or orders, the board may, in making subsequent proration orders, adjust any inequalities created thereby.

If it shall be made known to the board by any distributor, transporter, or purchaser by satisfactory proof that such distributor, transporter or purchaser requires gas to supply his markets and needs in excess of the total allowable production of the wells to which he is connected and that he is unable to obtain gas to fill such additional requirements from other distributors, transporters, purchasers, or well owners in such common source of supply at a cost reasonably approximating the current market price of gas at the well in such common source of supply, then the board shall in making proration orders hereunder take into consideration such circumstances and make reasonable allowance to such distributor, transporter, or purchaser for a withdrawal of gas from his wells in excess of their pro rata production, so long as such circumstances exist.

(e) It shall be unlawful for any person to produce gas from a gas well affected by such order in any month in excess of the allowable production of such well for such month. But when unforeseen contingencies increase the demand for gas required by any distributor, transporter, or purchaser of gas to an amount in excess of the total allowable production of the wells to which he is connected, such distributor, transporter, or purchaser is authorized to increase the amount of gas taken from all such wells ratably in order to supply his demand for gas; provided, however, that notice of such increase and the amount thereof shall be given to the board within five (5) days, and provided further that the board shall, at the earliest possible time in making a subsequent proration order, adjust the inequality of withdrawals caused by such increase, in fixing the allowable production of the various wells in the common source of supply. Willful violation of a proration order shall make the person violating the same subject to the penalties provided in section 43 of this act.

(f) The board may require persons affected by this act to file reports containing information and data necessary in determining the allowable production of gas wells, and may obtain such information in any other proper manner. The board may make reasonable rules and regulations with respect to the procedure to be followed by it in making and enforcing proration orders.

(g) The board shall have the authority to make proration orders with respect to oil wells located in a common source of supply, if necessary, in accordance with the provisions of this section. (*L. 1932, c. 117, sec. 9, as amended by L. 1936, c. 305, sec. 1.*)

SECTION 10. *Drilling of Gas Wells, Permit Required.*—Notice shall be given to the state oil and gas supervisor of the intention to drill, deepen, or plug any oil or gas well or wells, and of the exact location of each and every such well; and also any well or wells to be drilled for the purpose of exploration only and accompanying the notice of intention to drill shall be the statutory fee of $25.00 per well, whether the proposed well is to be drilled in proven territory or in "wild-cat" territory, or in an undeveloped field or territory, for oil or gas, or for information only. (*L. 1932, c. 117, sec. 10, as amended by L. 1934, c. 154, sec. 1.*)

SECTION 11. *Gas to be Confined—Protection from Infiltrating Water.*—Whenever natural gas in commercial quantities, or a gas-bearing stratum known to contain natural gas in such quantities, is encountered in any well drilled for oil or gas in this State, such gas shall be confined to its original stratum until such time as the same can be produced and utilized without waste, and all such strata shall be adequately protected from infiltrating water.

SECTION 12. *Prevention of Waste Generally, Employing Improved Methods.*—All operators, contractors, drillers, pipe-line companies, gas-distributing companies, or individuals, drilling for or producing gas, or piping gas for any purpose, shall use every reasonable precaution in accordance with the most approved methods to stop and prevent waste of gas in drilling and producing operations, or distributing the same, and shall not wastefully utilize gas, or allow it to leak or escape from natural reservoirs, wells, pipe lines, or other containers.

SECTION 13. *Accurate log to be Kept of Each Well.*—Oil and gas producers and operators in this State shall keep an accurate and complete log of each and every well they drill, or deepen, showing all formations drilled through, and into, casing used with the depth at which it is set, and all information concerning such well, metal line measurements to be made to the casing seat of each string of casing. This log and information shall be kept at the well during the time it is being drilled, and such producers or operators shall furnish the State Oil and Gas Supervisor with two typewritten copies of such log and information of each well not later than fifteen days after the completion or abandonment of any well.

SECTION 14. *Dry Wells to be Plugged.*—All dry wells, or wells intended to be abandoned, must be plugged by confining all oil, gas, or water in the strata in which they are found.

SECTION 15. *Regulation of Deepening, Plugging, Abandonment, etc.*—No well shall be deepened, plugged, repaired, abandoned permanently or temporarily, neither shall the casing set in any well be sidetracked, perforated, or otherwise disrupted, without a written permit from the State Oil and Gas Supervisor, except in case of emergency. The State Gas and Oil Supervisor shall direct the manner in which all such work must be done. Before doing any of the things enumerated in this paragraph, except in cases of emergency, written notice of the time and place of such work must be given said supervisor in ample time for him to have a representative there.

SECTION 16. *High Pressure Gas Equipment to Meet, Required.*—After the surface casing of any well is set in any field where it is not known that high pressure does not exist, proper anchorage shall be made to the surface casing so that the control casing head may be used in the two outer strings of casing at all times, and this type of casing head shall be kept in readiness for use in case high pressure gas is encountered.

SECTION 17. *Preparation Required.*—In all proven or well-defined oil or gas fields, or where it can be reasonably expected that oil or gas in commercial quantities will be encountered, adequate preparation shall be made for the conservation of oil or gas before "drilling in" any well.

SECTION 18. *Slush Pit or Sump Hole.*—Before commencing to drill a well a separate slush pit or sump hole shall be constructed by the owner, operator, or contractor, for the reception of all pumpings from clay or soft-shale formations in order to have the same on hand for the making of mud-laden fluid.

SECTION 19. *Using Same Casing for Different Strata Forbidden—Exception.*—No well shall produce oil or gas through the same casing from different strata at the same time without a written permit from the State Oil and Gas Supervisor. If a stratum should be encountered bearing gas and the owner, operator, or contractor should desire to go deeper in search of either gas or oil, the stratum first penetrated and likewise each and every oil or gas sand in turn, shall be closed separately, and if it is not wanted for immediate use it shall be securely shut in so as to prevent waste, either open or underground.

SECTION 20. *Sealing off Stratum.*—No well shall be drilled through or below any oil, gas, or water stratum without sealing off such stratum or the contents thereof regardless of volume or thickness of the sand.

SECTION 21. *Application of Mud-Laden Fluid as Safeguard.*—No gas sand or stratum upon being penetrated shall be drilled or left open, except at the direction of the supervisor, without the application of mud-laden fluid or other means to prevent the escape of oil or gas while further drilling in or through such sand or stratum.

SECTION 22. *Fresh Water to be Safeguarded from Pollution.*—Fresh water, whether above or below the surface, shall be protected from pollution, whether in drilling or plugging. Provided, however, nothing in this Act is intended or shall be construed so as to in any manner prohibit the reasonable discharge or escape of oil or fluid incident to the prudent drilling, cleaning, or operation of wells for oil or gas.

SECTION 23. *When Separation of Oil and Gas Underground Impossible.*—When oil and gas are found in the same stratum, and it is impossible to separate underground the one from the other, the operator shall install at the surface a separating device of approved type which will be kept in place and used as long as necessity therefor exists, unless ordered otherwise by the State Oil and Gas Supervisor.

SECTION 24. *State Supervisor and Members of Board to have Access to All Wells.*—The Supervisor, members of the Board and their representatives or employees shall have access to all wells at any and all times, and all companies, contractors, or drillers shall permit the State Oil and Gas Supervisor, the members of the Board or their representatives to go upon any lease or property operated or controlled by them, and shall permit them to inspect any and all wells, and well records, while being drilled and at other times, and have such control over such property, machinery, and appliances as may be requisite to gauge the wells, except that the records of wild-cat wells shall not be subject to this rule until the well is completed.

SECTION 25. *Casing Required under Varying Conditions.*—In drilling oil or gas wells in this state it shall be unlawful for any operator or operators to use less than three strings of casing in known high-pressure gas areas. Each casing shall be of such unit weight as to have a factor of safety of at least two (2) with reference to collapse from external hydrostatic pressure as determined by the commonly used table of figures for collapse of casings. All casings shall be set in suitable formation and securely cemented in accordance with the best practice. A satisfactory test showing that the water is shut off by each string of casing shall be made before continuing with drilling. The final string of casing shall be cemented with at least 100 sacks of cement, and as near as practicable to the oil and gas formation, using no solid foreign material with the cement.

SECTION 26. *Testing of Casing.*—No person, firm, association or corporation shall use a joint of pipe or casing as portion of the last water string above high-pressure gas or any deeper strings of casing in a well or wells without first testing such casing by plugging or capping both ends and filling same with cold water and applying the following pressures for different sizes of casing:

8 inch or 8¼ inch	1,200 lbs. per square inch.
6⅝ inch	1,400 lbs. per square inch.
6¼ inch or smaller	1,500 lbs. per square inch.

It shall be unlawful to use any joint of pipe or casing in any well that does not fully stand such a test without injury thereto, and each joint of pipe or casing, so used, shall be tested separately within thirty (30) days prior to its use. Provided, however, that the State Oil and Gas Supervisor may relieve, by written permit, any driller or operator from the necessity of complying with the provisions of this Section, if in his judgment he thinks that the rule should be abated in a particular case, or in any particular area.

SECTION 27. *When Oil or Gas Well May be Shot—Permit.*—No oil or gas well shall be shot without a written permit from the supervisor and only then under such rules and in such manner as the Board shall direct.

SECTION 28. *Rock or Working Pressure Test.*—The surface equipment of every gas well shall include fittings that will allow representatives of the Board to take rock pressure or working pressure test of a gas well at any time, including the time when the initial open flow capacity test is made.

SECTION 29. *Pressure Between Casings—Remedy.*—When an operator discovers that pressure has developed between casings, he shall immediately notify the State Oil and Gas Supervisor. When any well develops a gas pressure between casings, due to a leak of gas through or around the inner casing, such condition of underground waste shall be corrected, if possible, by cementing another string of pipe or otherwise repairing the well in a manner satisfactory to the said supervisor. Only as a last resort and with the consent of the said supervisor shall the repair of such conditions be attempted with cement or other material by introducing it between casings at the surface and forcing or gravitating it downward.

SECTION 30. *Cementing of Water Strings of Casing.*—All final water strings of casing shall be cemented by efficient methods of cementing.

SECTION 31. *Removal of Water by Blowing—When Permitted.*—No water shall be removed from gas wells by blowing it through the casing, except for such wells as the supervisor may find it necessary to make exception. The water shall be removed from the wells, if practicable, through lines of smaller diameter, installed in the casing, and commonly known as siphons.

SECTION 32. *Gas Must be Metered.*—No gas shall be taken from any gas well without being metered except the gas used in further operations on the lease. The meter shall be of approved type at or near the well, and no bypass shall be on the gas line at such a place that the gas can be passed around the meter.

SECTION 33. *The Meter to be Used—Requirements.*—No meter or measuring apparatus shall be of a size or capacity other than that reported by the producer to the supervisor. There shall not be any wilful or intentional leakage of gas in or near the meter, or measuring apparatus, or any condition knowingly existing in the meter, or measuring apparatus, or in the gas line that causes the meter or measuring apparatus to register any other amount of gas than the true amount that is being drawn from the well.

SECTION 34. *Same—Authorities to Have Access to Meters.*—Each well shall be equipped with a meter, properly housed and locked, and the State Oil and Gas Supervisor and members of the Board shall have access to all well meters, at all times, shall be furnished with duplicate keys to meter and meter houses, and shall make such reasonable tests as it may see fit, and shall be furnished at the end of each week, with all original meter records, and the Board shall, within 15 days return such records to the operator or producer, or photostatic copies thereof and the State Oil and Gas Supervisor shall keep a permanent record in his office showing the daily production of each gas and oil well. However, no adjustments of the meters or wells shall be made by the supervisor or his agents without due notice to the operators.

SECTION 35. *Gas Not to be Used for Flambeau Lights—"Jumbo" Burners Permitted.*—It shall be unlawful for any operator, contractor, driller, company, association, or corporation to use natural gas for illuminating purposes in what is known as flambeau lights, but nothing herein shall prohibit the use of "jumbo" burners or other burners in glass globe consuming no more gas than such "jumbo" burners.

SECTION 36. *Monthly Reports Required—Forms Prescribed.*—Every oil or gas producer shall make monthly reports on forms prescribed and furnished by the Board of all oil or gas wells completed during that month, and of all oil or gas produced during that month, showing the amount of oil or gas taken from each well and the location of such well, and of all oil or gas consumed, sold or purchased that month.

SECTION 37. *Tests of Open-Flow Capacity and Closed Pressure—How Often Made.*—(a) The supervisor shall make, or cause to be made, a test of the open-flow capacity of each producing well once every twelve months, and of the closed pressure of each producing well, whether the gas is being used from the well or not at least once every four months. He shall make, or have made, an inspection of the working pressure or back pressure of each well once every month. The supervisor shall make any or all of these tests oftener on certain wells if he thinks necessary, or he may omit taking them on certain wells when the condition of the well is such that it is not safe to do so. The rated open-flow capacity of each well shall be reduced or increased at the time of each closed-pressure test in the proportion that the closed pressure has declined or increased from the closed-pressure existing at the date of the last previous open-flow test.

(b) Gas shall not be used as motive power for pumps, engines, or other machinery instead of steam except in cases of emergency and where necessary to secure water for boilers to create steam in cold boilers, and also except when the gas is subsequently utilized, without the approval of the State Oil and Gas Supervisor; provided that nothing herein contained shall in any manner prevent the forcing of the same natural gas back into the same reservoir from which it originally came for repressure or conservation purposes.

SECTION 38. *Percentage of the Open-Flow Capacity that Gas Wells may be Allowed to Produce—Sizes of Tracts and Volume of Flow Permitted.—Location of Wells.*—The percentage of the open-flow capacity that gas wells may be allowed to produce or that may be drawn from each gas well shall depend upon the acreage upon which the well is drilled.

When a tract of 160 acres of land or more has one producing well on it there may be taken from such well no more than 24 percent of its open-flow capacity.

When a tract of 80 acres of land has one producing well on it there may be taken from such well no more than 21 percent of its open-flow cpaacity.

When a tract of 40 acres has one producing well on it there may be taken from such well not more than 18 percent of its open-flow capacity.

When a tract of 20 acres of land has one producing well on it there may be taken from such well no more than 15 percent of its open-flow capacity.

When a tract of 10 acres of land has one producing well on it there may be taken from such well no more than 12 percent of its open-flow capacity.

When a tract of 5 acres of land has one producing well on it there may be taken from such well no more than 9 percent of its open-flow capacity.

When a tract of less than 5 acres of land has one producing well on it there may be taken from such well no more than 7 percent of its open-flow capacity. Provided, that for the purpose of determining the percentage of open-flow capacity allowed to be withdrawn on acreage or area used as a basis for claiming the percentage herein allowed must be contiguous and adjoining the tract of land on which the well is located.

When the acreage on which any well is drilled is between any two of the above classes the percentage of its open-flow capacity that such well may produce shall be in direct proportion between the percentage that a well of a larger acreage will be allowed to produce and the percentage that a well on the smaller acreage will be allowed to produce.

Where the percentage hereinabove provided applied to any well reduces the amount allowed below 1,000,000 cubic feet there may be taken from such well a total of 1,000,000 cubic feet, provided the back pressure as elsewhere herein provided for shall be maintained.

When two or more wells are drilled on one tract, as above described, for the purpose of determining the allowable percentage that such well may produce the tract shall be divided by the owner or lessee into two or more tracts of smaller class and the allowable percentage determined by the rules governing the smaller tracts.

All wells shall be drilled as near the center of the acreage units above provided for as is practicable, and the Supervisor shall not issue a drilling permit that will violate the provisions hereof, provided, that offset wells, located diagonally or opposite and where possible, equidistant from the property line may be drilled to all wells now or hereafter drilled, and such offset well or wells shall be allowed to produce the same percentage of open-flow capacity as the well or wells so offset.

The withdrawal percentages provided for in this Section shall not apply to a gas field or common source of supply within the State of Mississippi in which the combined open-flow capacity of all the wells does not exceed ten million cubic feet of gas per day.

SECTION 39. *Allowable Percentage Each Gas Well May Produce—Determined by Supervisor.*—The Supervisor shall determine in accordance with the above provisions the allowable percentage that each gas well may produce, and such determination shall protect the gas producer from any of the penalties by this act provided; and the failure of the Supervisor to determine in advance the allowable quantity that each well may produce shall authorize the gas producer to determine such percentage without incurring the penalties provided by this Act.

It shall be unlawful for any person, firm, corporation, or association of persons to take more gas from any well for a period of seven consecutive days than the maximum production allowed to be taken from such well would amount to for the same period, or to take more gas from any well in any one day than one and one-half times the allowable production of such well, or to take any gas whatever from any gas well when the working pressure of such well is less than one-half the closed pressure of such well; provided, that the working pressure of any well cannot be reduced below 200 pounds regardless of what the closed-pressure is. Provided, further, that in all fields where the rock pressure is less than 200 pounds and the gas is being produced, sold and transported for domestic and industrial fuel purposes exclusively the back pressure herein provided for shall not apply where artificial means are employed to produce and market the gas from such fields, and when the rock pressure of such fields is less than 150 pounds the withdrawal percentage provided for herein shall not apply.

When in his judgment he thinks it necessary to conserve the gas in any well or in any area, or to protect any person from financial loss, the Oil and Gas Supervisor may increase or decrease the percentage of the open-flow capacity that may be taken from any gas well or wells, or he may increase or decrease the working pressure required to be maintained in such gas wells.

SECTION 40. *Cooperative Agreements.*—Agreements made in the interest of conservation of oil and gas, or the prevention of waste, between and among operators owning separate holdings in the same oil and gas pool, or in any area that appears from geological or other data to be underlaid by a common accumulation of oil and gas, or both, or between and among such operators and royalty owners therein for the purpose of bringing about the development and operation of said pool, or area, or any part thereof, as a unit of establishing and carrying out a plan for the cooperative development and operation thereof, when such agreements are approved by the Board, are hereby authorized and shall not be held or construed to violate any of the statutes of this State relating to monopolies or contracts and combinations in restraint of trade.

SECTION 41. *Attorney to Represent Board or Supervisor.*—It shall be the duty of the Attorney General or the District or County Attorney of any judicial district or county where the businesses described herein are conducted to represent the State Oil and Gas Supervisor or the State Oil and Gas Board in the enforcement of the provisions of this Act and of the orders, rules, and regulations made, adopted, and promulgated by the said Board by authority of this Act. All criminal prosecutions under this Act shall be by the District Attorney or County Attorney of the Judicial District or County having jurisdiction of such offense the same as any other criminal prosecution.

SECTION 42. *Records—Inspected by the Public.*—All well logs, casing records, meter readings, compiled data, and/or other information shall be properly indexed, suitably recorded in permanent records in the office of the supervisor, and be open to inspection by the public.

SECTION 43. *Penalty for Violation of Act or Regulations.*—Any person, partnership, firm, corporation, or association of persons wilfully violating any of the provisions of this Act, or any rule or regulation promulgated by authority of this Act, shall be guilty of a misdemeanor, and upon conviction thereof shall be punished by fine of not less than fifty dollars and not more than one thousand dollars for each offense, and each day's violation shall constitute a separate offense.

SECTION 44. *Power of Supervisor to Enjoin—Injunction Against Board.*—The Supervisor shall have power by injunction or other legal writ or process to enforce compliance with or prevent violation of the provisions of this Act, or the regulation promulgated hereunder. Such actions may be conducted by the Supervisor in his own name; provided, however, that he shall not be required to give bond for injunction or otherwise. Provided, further, that no injunction may be issued to restrain the Supervisor or members of the Board, or their agents in carrying out the provisions of this Act or the regulations promulgated hereunder, except upon not less than three days notice.

SECTION 45. *Definitions.*—The following definitions and constructions are a part of and shall be used in construing the meaning and purposes of this Act and the regulations thereunder; "day" means a day of twenty-four hours; "person" means a natural person, a partnership, an association of persons, or a corporation; "well" means either a gas well, oil well or water well, as the context shows; "gas" means natural gas as it is taken from the earth, including any gasoline content it may have, but it does not include casinghead gas; gas in "commercial quantities" means gas in any well-defined area or producing horizon regardless of the amount of gas found. Where gas is referred to in this Act by measurement, it means that the gas shall be measured at a pressure of ten ounces above the atmospheric pressure existing in the given area; "open-flow capacity" is computed and shall be computed on the basis of what it would be if the gas was being produced and measured through a six inch casing; "closed pressure" means the maximum pressure that results from closing in the well; a "wild cat well" is a well drilled in unproven territory; whenever under the provisions of this Act or the regulations thereunder, the approval or permit from the Supervisor of the Board is referred to, it shall mean and require that same be in writing.

SECTION 46. *Purpose of Act Defined.*—The purpose of this Act is hereby stated to be to conserve the resources of oil and gas in the state of Mississippi and to aid and encourage the development of the oil and gas industry in this state, and the provisions of the Act shall be construed, and the regulations authorized hereunder shall be promulgated, to this end.

SECTION 47. *Constitutional Provisions.*—If any of the provisions, sections, subdivisions, rules or part of this Act, or rule or regulation adopted or readopted by the State Oil and Gas Board under authority granted by this Act shall be held unconstitutional, or for any other reasons shall be held void, such holdings shall not invalidate any section, subdivision, rule, or part of this Act, or rule or regulation adopted or readopted by the State Oil and Gas Board under authority granted by this Act.

SECTION 48. This Act shall take effect and be in force from and after its passage.

Chapter 129, Laws of 1932

SECTION 1. *Fee for Permit.*—It shall be the duty of the state oil and gas supervisor to collect from each person, firm, or corporation a fee of $25.00 before granting such person, firm, or corporation a permit to drill a well in search of oil or gas in the state of Mississippi. The oil and gas supervisor shall pay all fees so collected into the state treasury, and the state treasurer shall deposit such collections in a special fund to be known as "The Oil and Gas Conservation Fund" and shall hold such fund in trust for the use of the oil and gas board. Such funds may be paid out only upon requisition approved by said board and for such uses as may be shown by itemized statement thereto attached. (L. 1932, c. 129, sec. 1.)

STATE OIL AND GAS BOARD OF MISSISSIPPI

Docket No. ———.

In re conservation and prevention of waste of crude oil or petroleum and natural gas in the Tinsley field, Yazoo County, Mississippi.

JACKSON, MISSISSIPPI, *September 25th, 1939.*

ORDER NO. ———

ADOPTING AND PROMULGATING FIELD RULES FOR THE TINSLEY FIELD, YAZOO COUNTY, MISSISSIPPI

"Whereas, oil is now being produced commercially in the Tinsley Field, Yazoo County, Mississippi, and it appearing to the Board that in order to prevent waste in the production of oil and gas in said field it will be necessary to promulgate and enforce rules and regulations providing for the proper and uniform spacing of wells drilled for oil or gas in said field and for the proper drilling, equipping, and completing of said wells, and the designation of drilling of spacing units and promulgation of the method of prorating production of oil and gas to such drilling or spacing units in the event of the proration of production from said field; and

"It further appearing that it is the duty of the Board to adopt such rules and regulations at this time on account of the waste which is threatened through the indiscriminate drilling of wells for oil and gas in the Tinsley Field without any uniform spacing thereof and without any regulations for the proper drilling, equipping, and completing thereof:

"Now, therefore, pursuant to the provisions of Chapter 117 of the Laws of 1932, and of Chapter 305 of the Laws of 1936 of the State of Mississippi, and in order to conserve and prevent the waste of crude oil or petroleum and natural gas produced in the State of Mississippi, the following rules and regulations are hereby adopted by the State Oil and Gas Board of the State of Mississippi, effective this date, for the Tinsley Field in Yazoo County, and it is so ordered:

"RULE 1. The Tinsley Field shall be divided into drilling or spacing units approximately 40 acres each, conforming as closely as possible to the boundaries of the sectionized subdivisions of said land. For the purpose of this order, the Tinsley Field shall for the present be construed as including the E/2 of Section 3, 2, and 1; E/2 of Sections 10, 11, and 12; E/2 of Sections 15, 14, and 13; E/2 of Sections 22, 23, and 24; E/2 of Sections 27, 26, and 25; Township 10 North, Range 3 East; Sections 6, 7, 18, 19, and 30, Township 10 North, Range 2 West, in Yazoo County, Mississippi, and as the limits of said field may be further extended additional 40-acre units may be added by the Board. Only one well may be drilled on each drilling or spacing unit to each producing horizon and in all instances said well shall be located as nearly as practicable in the center of the unit upon which it is drilled, except that where it is impracticable because of topography or otherwise to locate said well in the center of such unit, it may be located within one hundred and fifty (150) feet of the center thereof.

"As to all tracts containing less than 40 acres, the Board, in order to prevent waste or to prevent confiscation of property, may grant exceptions to permit drilling on such tracts upon application therefor as hereinafter provides; provided, however, the Board will not grant an application to drill on a tract or tracts containing less than 40 acres until the applicant shall have first made a bona fide effort to pool such tract or tracts with a contiguous tract or tracts or parts thereof, so as to establish at least a 40-acre drilling or spacing unit. In all such cases applicant shall offer evidence at the hearing on his application concerning his efforts to enter into a pooling agreement. Any such application for an exception shall be filed with the Board, fully stating the facts, which application shall be accompanied by a plat drawn to the scale of one (1) inch equalling four hundred (400) feet, accurately showing to scale the property on which the permit is sought to drill a well under the exception to this rule, and accurately showing to scale all other completed drilling and permitted wells on said property, and accurately showing to scale all adjacent surrounding properties and wells thereon. Such application shall be verified by some person acquainted with the facts, stating that all statements and representations therein made are, within the knowledge of the affiant, true, and that the accompanying plat is accurately drawn to scale and correctly reflects all pertinent and required data. Such exception shall be granted only after at least ten (10) days' notice to all lessees and operators of adjacent properties affected thereby has been given, and after public hearing at which all interested parties may appear and be heard, and after the Board has determined that applicant has been unable to pool his tract or tracts with contiguous tract or tracts or parts thereof so as to establish at least a 40-acre drilling unit, and has determined that an exception to such rule is necessary, either to prevent waste or to protect from confiscation the property belonging to applicant.

"RULE 2. The casing program of all wells hereafter drilled in said field shall include at least two (2) strings of pipe set in accordance with the following program:

"(A) New or reconditioned pipe with a mill test to twelve hundred (1200) pounds per square inch shall be set and cemented at a point not shallower than the contact between the Sparta Sand and the underlying Cane River formation, but in no case less than fifteen hundred (1500) feet below the surface. Sufficient cement shall be used to fill the calculated annular space back of the pipe to the surface of the ground. Cementing shall be by the pump and plug method. Cement shall be allowed to stand a minimum of twenty-four (24) hours under pressure and a total of forty-eight (48) hours before drilling plug or initiating test.

"Surface casing shall be tested by pump pressure in the following manner:

"The mud-laden fluid in the hole shall be replaced by clear water and pump pressure of at least one thousand (1,000) pounds per square inch applied. If at the end of thirty (30) minutes pressure shows a drop of one hundred fifty (150) pounds or more, the casing shall be condemned. After the corrective operation the casing shall again be tested in the same manner.

"(B) The producing or oil string shall be new or reconditioned seamless casing that has been tested to two thousand (2,000) pounds per square inch, and shall be set so as to shut off all oil, gas or water horizons lying immediately above the top of the oil producing horizon and cemented with not less than two hundred (200) sacks of cement. Cement shall be allowed to stand a minimum of twenty-four (24) hours under pressure and a total of forty-eight (48) hours before drilling plug or initiating test.

"Casing shall be tested by pump pressure in the following manner:

"The mud-laden fluid in the hole shall be replaced by clear water and pump pressure of at least one thousand (1,000) pounds per square inch applied. If at the end of thirty (30) minutes pressure shows a drop of one hundred fifty (150) pounds or more, the casing shall be condemned. After the corrective operation the casing shall be tested in the same manner.

"RULE 3. A blow-out preventer, control head, and other connections for keeping well under control at all times shall be installed as soon as surface casing is set. The blow-out preventer on the surface string of pipe shall be of dual control or such type of construction and operation as to satisfy any test which may be required by the Board. Blow-out preventer shall be tested at least once every eight (8) hours; all control equipment shall be in good working order and condition at all times.

"Rule 4. All wells shall be equipped with Bradenhead with a working pressure of not less than three thousand (3,000) pounds per square inch. Bradenhead shall not be welded, and as soon as installed, the same shall be equipped with the proper pipe connections and valve accessible from the surface. Whenever pressure develops between any two (2) strings of casing the Agent of the Board shall be notified immediately. No cement may be pumped between any two (2) strings of pipe at the top of the hole, except after permission has been granted by the Board's Agent in charge of the District in which said field is located.

"Rule 5. Any well showing pressure on the Bradenhead, or leaking gas or oil between the surface casing and the oil string, shall be tested in the following manner: The well shall be killed and pump pressure applied through the tubing head. Should the pressure gage on the Bradenhead reflect the applied pressure, the casing shall be condemned, and a new oil string shall be run and cemented. This method shall be used when the origin of the pressure cannot be determined otherwise.

"Rule 6. All wells shall be cleaned into a pit not less than forty (40) feet from the derrick floor and one hundred fifty (150) feet from any fire hazard.

"Rule 7. The authorized Agent of the Board is hereby empowered to make gas-oil and/or bottom-hole pressure test on any well at any time, and the owner of such well is hereby directed to do all things that may be required by him by the Board's Agent to properly make such tests.

"Rule 8. All flowing wells shall be equipped with, and produced through, tubing of not more than two and one-half (2½) inches in diameter. Bottom of tubing shall not be higher than the top of the producing sand. Tubing shall be free of obstructions in order to permit free entrance to bottom-hole instruments.

"Rule 9. All flowing wells must be produced through an oil and gas separator of ample capacity and in good working order. Sufficient tankage shall be provided on each lease to permit the proper taking of the allowable production. Lease or working tanks shall be so operated as to permit proper gaging.

"Rule 10. No well shall be operated with a gas-oil ratio in excess of two thousand (2,000) cubic feet of gas per barrel of oil produced, except as set out in Rule 11.

"Rule 11. Any well producing with a gas-oil ratio in excess of two thousand (2,000) cubic feet per barrel of oil produced, shall be allowed to produce a total volume of gas equivalent to that of any other well producing from the same reservoir within the limitations as set by the Board.

"Rule 12. All wells shall be equipped with adequate chokes, or flow beans, to properly control the flow thereof.

"Rule 13. All wells producing two (2) percent or more salt water must be reported by their owner or operator to the Board's Agent at Jackson, Mississippi.

"Rule 14. No boiler or electric lighting generator shall be placed or remain nearer than one hundred fifty (150) feet to any producing well or oil tank.

"Rule 15. All swabbing and/or bailing operations shall be completed in the daylight hours before sunset. Drill stem tests shall likewise be made during the daylight hours.

"Rule 16. All permanent oil tanks, or battery of tanks, must be surrounded by a dyke or fire wall, with a capacity of at least one and one-half (1½) times that of the capacity of the tank or battery of tanks.

"Rule 17. No well shall be brought into production without a written permit from an authorized Agent of the Board showing that the well has been properly completed and equipped. If inspection is not made within twenty-four (24) hours after written notice is given said Agent, written permit shall be waived.

"Rule 18. Any rubbish or debris that might constitute a fire hazard shall be removed to a distance of at least one hundred fifty (150) feet from the vicinity of wells, tanks, and pump stations. All waste shall be burned or disposed of in such manner as to avoid creating a fire hazard, or polluting streams and fresh water strata.

"Rule 19. When coming out of the hole with the drill pipe, drilling fluid shall be circulated until equalized and a fill-up line shall be turned into the casing to insure a full load of fluid on the bottom of the hole at all times.

"Rule 20. In the event the Board prorates the production of oil and gas from said Tinsley Field, such proration shall be on the basis of the drilling or spacing units provided for above upon which a producing well is located. Each such producing unit of approximately 40 acres shall constitute a proration unit and each such producing unit of less than 40 acres shall be a fractional proration unit.

The production from each well shall be based on the number of acres in the proration unit, whether fractional or not. A tolerance of 10 acres on producing tracts of more than 40 acres shall be allowed for proration purposes when the size and shape of the tract warrants and after the tract has been drilled to its final density.

"RULE 21. No well drilled in violation of the rules and regulations above set out without special permit obtained in the manner herein above described, and no well drilled under any such special permit which does not conform to the terms of such special permit in all respects shall be permitted to produce either oil or gas, and any such well so drilled in violation of the above mentioned rules, or in violation of a permit issued under an exception to the above mentioned rules shall be plugged.

"The Board expressly reserves its right to alter, amend or repeal any and all of the above rules and regulations, or any part or parts thereof at any time the public interest in the discretion of the Board may require it."

STATE OIL AND GAS BOARD OF MISSISSIPPI,
By ——— ———, *Governor,*
——— ———, *Attorney General,*
——— ———, *State Land Commissioner,*
Members of the Board.

Attest:
——— ———, *Secretary.*

RULES AND REGULATIONS

1. Application for a permit to drill in proven territory must be made to the State Oil and Gas Supervisor, accompanied by the statutory fee of $25.00, and giving the size of the tract, the description of it, and the exact location of the proposed well, before any drilling operations shall be begun.

2. Accurate logs shall be kept of all wells drilled in the state, and the log of each well shall be kept at the well and, except in the case of wild-cat wells, be open at all times to examination by any representative of the State Oil and Gas Board.

3. Notice shall be given to the State Oil and Gas Supervisor of the approximate hour at which any casing that requires cementing shall be run, in time for the Supervisor to be present himself or to have a representativeon the well, and the running of the casing shall not begin until after the arrival of the Supervisor or his representative.

4. On the "Jackson Structure" the second string of casing, usually ten-inch casing, shall be set and cemented, with not less than twenty-five sacks of cement, below the Sparta Sand in the shale or gumbo of the Cane River formation, and this means that this string of casing shall be at least 700 feet long, and sometimes longer, depending on the elevation, and shall be run in all wells drilled inside the City of Jackson, in accordance with the City Ordinance on the subject, and in all wells drilled outside of the City limits and within one mile of any well that is producing or has produced either gas or oil in commercial quantities.

5. In the Jackson Gas Field, when six and five-eighths inch casing to be used for the final string is NEW, SEAMLESS and weighs TWENTY POUNDS or more per foot, it may be run without testing.

IN ALL OTHER CASES, the test required by law will be applied and must be made in the presence of a representative of the State Oil and Gas Board.

6. The final string of casing shall be cemented with at least 100 sacks of cement, and as near as practicable to the oil and gas formation, using no solid foreign material with the cement. The cementing shall be done in the presence of a representative of the State Oil and Gas Board unless the operator has secured, in advance, from the State Oil and Gas Supervisor a permit in writing to do otherwise.

7. Notice of intention to abandon a well must be given in writing to the State Oil and Gas Supervisor in time for him to be present himself or to have a representative on the well to prescribe the materials to be used in plugging the well, and to direct the manner of doing the work.

8. The State Oil and Gas Supervisor and his representatives shall have power and authority to stop operations whenever in his judgment or theirs the said operations have been, or are being, carried on in violation of the provisions of the Conservation Act, and/or of the Rules and Regulations of the State Oil and Gas Board, and it shall be incumbent on the operator to satisfy the Board in the premises before work on the well may be resumed.

9. The State Oil and Gas Supervisor shall have authority to refuse a permit to drill to any operator who, in the judgment of the Supervisor, has on occasion

knowingly evaded or sought to evade any of the provisions of the Conservation Act and/or of the Rules and Regulations of the State Oil and Gas Board.

10. The State Oil and Gas Supervisor shall have the power and authority to have a steel line measurement made, at the expense of the operator, of any well whenever he has good reason to believe that the depth to any casing seat or the total depth of the well has not been correctly given out by the operator either by design or mistake.

THE STATE OIL AND GAS BOARD OF MISSISSIPPI.

Mr. COLE. For the State of Illinois Mr. M. I. Lighton, chief of the State geological survey division is preparing a written report and statement for the record to be available sometime this week. When it is received it will be filed and printed as a part of the record.

Is there anyone here from the State of New Mexico?

Mr. DOW. Yes, Mr. Chairman.

STATEMENT OF HIRAM M. DOW, MEMBER OF THE INTERSTATE OIL COMPACT COMMISSION, REPRESENTING THE STATE OF NEW MEXICO

Mr. COLE. State your full name, please?

Mr. DOW. Hiram M. Dow. I have with me members of our conservation commission, Mr. Andres and our proration umpire, Mr. Staley.

Mr. COLE. They are all here?

Mr. DOW. Both of whom are present and on technical questions and so forth, as to actual operations, I would like to have them testify.

Mr. COLE. What is your position, Mr. Dow?

Mr. DOW. I have no official position in New Mexico. For the past 4 years I have represented the former Governor and this Governor, and the State, on the interstate oil compact commission.

Mr. COLE. Do you represent the Governor today in your appearance here?

Mr. DOW. Yes, sir.

Mr. COLE. How long will it take, Mr. Dow, for all three to present their statements?

Mr. DOW. Well, sir, I ought to finish within 20 minutes, around 20 minutes; and Mr. Andres has a statement which will take about the same time, and Mr. Staley has no prepared address. We have, of course, some exhibits we want to put in. I think that probably an hour, taking into consideration that you might want to ask some questions, an hour for all three of us.

Mr. COLE. Let me inquire off of the record as to who else is here.

(After informal proceedings off the record.)

Mr. COLE. Following this group I understand that the compact commission is ready to be heard. Is that right, Colonel Thompson?

Colonel THOMPSON. That is right.

Mr. DOW. I think that my remarks will cover what I have to say concerning the compact commission. I intend to cover our position in the compact as I go along with my testimony on New Mexico; but, from a compact standpoint, I doubt if I will desire to say anything further from what I shall say in my paper on New Mexico cooperation.

Mr. COLE. As I have stated before, the conference between the Senate and the House on the important transportation bill, legislation passed in the last session, is very actively in session at this time and has been for some days past. I have missed a number of the sessions this week. I am one of the conferees and I want to be there by 11 o'clock this morning. I am quite sure if they are not in session we will meet here this afternoon.

Mr. Wolverton and Mr. Holmes are on the conference. There are some questions arising from day to day which make it almost imperative that we be there. I want to say for the other members of the committee that they will read these statements, copies of which you gentlemen who are appearing leave for the record.

All right, Mr. Dow, you may proceed.

Mr. Dow. Mr. Chairman and gentlemen of the committee, in view of the scope of the resolution of the committee, it was New Mexico's idea to place before your honorable committee our record in conservation, which we believe to be an achievement, and our papers have been prepared along that line.

I think, in the light of what I have learned here and in view of the questions asked yesterday, I might digress a little bit from the prepared statement which I have to submit.

I have long been a resident of the State of New Mexico, and as one of its citizens have watched the petroleum industry's development from a very meager beginning, until it is now the leading industry. As a member of the legal profession, I have taken a keen interest in the development of conservation laws in general, and particularly in my State, especially as affecting the petroleum industry.

As Lieutenant Governor of the State, and as a representative of the former and present Governors on the Interstate Compact Commission, I have worked with the organization in bringing about, in friendly cooperation, representatives of oil-producing States, each of which, according to the report of the National Resources Committee (p. 214), "has been interested in obtaining as large a share of the national output as possible without jeopardizing the value of its volume of production"; and of which it was said, "Moreover, they have been unwilling to accept the Federal Government's determination of how much oil the individual States should produce"; and further: "Yet competitive interests of the various States have held back the adoption of comprehensive conservation regulations."

Whether or not the statements just quoted were true before the formation of the interstate compact I do not know, but I wish to assure you that for several months past there has been the fullest accord among compact States, in following the quotas laid down by the Bureau of Mines and in adopting comprehensive conservation regulations.

The oil-producing history of New Mexico covers some 16 years. The development during the first half dozen years of this period were not spectacular, although her production exceeded a million barrels as early as 1925 and had climbed to 2,000,000 barrles in 1929. Her real importance as a factor in the oil industry of the United States might properly date from the rapid development which took place in the Hobbs pool in 1930. With the exception of the 3 depression years following this, development has been at a rapid rate, and today the State is producing 35,000,000 barrels annually and is credited with developed reserves of well over 790,000,000 barrels as of January 1, 1940.

The brief history just noted is important in that a close parallelism may be observed to exist between New Mexico's producing history and the evolution of her statutory control.

Quite naturally, before the days of any appreciable development, the lack of problems rendered specific legislation unnecessary. The conservation statute of 1909 did little more than create a conservation commission empowered to make "surveys" and collect data concerning the natural resources of the State.

New Mexico, at the very beginning, recognized the necessity of proration, for the discovery of oil in Lea County in 1927, and subsequent drilling, developed considerably more oil than the market could absorb. The legislature of 1929 enacted a law providing for the cooperative development of oil fields. This law provided (chap. 132, Laws 1929, secs. 1 and 2)—Mr. Chairman, I do not read that, but I have it set out in my paper for the purpose of the record. May I skip that and let it appear in the record?

Mr. COLE. Is it very long?

Mr. DOW. No, sir.

Mr. COLE. Just what you have referred to on page 3 of your statement?

Mr. DOW. Yes, sir.

Mr. COLE. Very well.

(The quotation above referred to is as follows:)

> Agreements made in the interest of conservation of oil and gas, or the prevention of waste, between and among operators owning separate holdings in the same oil and gas pool, or in an area that appears from geological or other data to be underlaid by a common accumulation of oil or gas, or both, or between and among such operators and royalty owners therein for the purpose of bringing about the development and operation thereof, when such agreements are approved by the State geologist, are hereby authorized and shall not be held or construed to violate any of the statutes of this State relating to monopolies or contracts and combinations in restraint of trade.
>
> When such agreements are described in section 1 of this act relate to an oil and gas pool wherein are situated lands in which the State owns mineral or royalty interests, the commissioner of public lands is hereby authorized to enter into such agreements as a party thereto, on behalf of the State, when in his judgment the best interests of the State will be served thereby.

Mr. DOW. This law sanctioned agreements made in the interest of conservation of oil and gas and the prevention of waste between and among operators owning separate holdings in the same pool, and provided that such an agreement would not be construed to violate any State statute relating to monopolies or contracts and combinations in restraint of trade. All such agreements were required to have the approval of the State geologist in order to be legal. The commissioner of public lands was authorized to join with the operators in such agreements in pools or areas that included State lands when in his judgment the best interest of the State would be served thereby.

And in that connection, I call the committee's attention to the fact that the State owns 42 percent of the producing lands; 38 percent owned in fee and 20 percent by the Federal Government.

The Hobbs pool was operated under a proration agreement from July 10, 1930, until the effective date of the 1935 conservation statute.

The first noteworthy discovery in southeastern New Mexico was the development of 90,000,000 cubic feet of gas a day at the Texas Production Co. No. 1 Rhodes well in the Jal area, Lea County, in

1927. The first large oil well to be completed in Lea County was the Humble Oil & Refining Co. Bowers No. 1 well, in the Hobbs field, completed in 1929, which came in for 9,720 barrels of oil a day. This well resulted in an active drilling campaign, and a large part of the Hobbs field was soon developed. Inasmuch as the market outlet of this field was very small in comparison to the total potential of the wells, the necessity of prorating was obvious. The operators, in 1930, adopted a proration agreement for the field, which agreement was approved by the State geologist and signed by the commissioner of public lands as provided for by law. The agreement provided that proration in the field be handled by an operator's proration committee, the chairman of which should have direct supervision in the operation of the plan.

Effective March 1, 1934, the Jal and Eunice fields, which had been discovered in 1928 and 1929, were placed under proration and charge thereof given to the Hobbs proration committee. In 1935 the activities of the proration committee were enlarged to include all of Lea and Eddy Counties.

With the expanding oil development of the State of New Mexico, there came a need for more complete legislation to enforce conservation under proration, which, at that time, had become more or less general throughout all oil-producing States. To meet this need, the 1936 session of the legislature passed a very comprehensive law, which included many forward steps in conservation control. In 1937 the Hobbs proration committee gave way to the Lea County operator's committee, which functioned as an advisory body to the State's conservation forces, and assisted in an advisory way in coordinating all proration activities in New Mexico.

The oil conservation commission was created. This commission is given jurisdiction over all matters relating to the conservation of oil and gas in the State and the enforcement of the provisions of the oil conservation law. Waste of oil and gas, both underground and at the surface, is prohibited. The production of crude oil in excess of the reasonable market demand is prohibited.

In view of the stress, Mr. Chairman, that was laid upon the fact that the Arkansas law does not specifically provide for waste in that language, I wish to digress here just a little. Of course, under the Arkansas law, they have the power to restrict production to market demand. But it will be shown to this committee and no doubt will be pointed out to you that the production of oil in excess of market demand inevitably and necessarily results in physical waste; and if it is the intention to prevent physical waste, it is absolutely necessary for the definition of "waste" to include this form of actual physic waste as well as all other forms and to empower the conservation agency to prevent this form of waste as well as the other forms of waste.

No adequate conservation law, in my opinion, or no adequate conservation policy, can be established or enforced that does not prohibit and provide means to prevent the physical waste involved, and necessarily incident to and resulting from production of oil in excess of the reasonable market demands.

For one thing, the reduction of the production to market demand must be made in order to bring about the ratable taking of oil and to insure orderly and uniform production from the field in order to prevent the irregular encroachment of water, dissipation of the gas energy of the pool with the resulting loss underground of oil and gross inequities as between operators.

In other words, it is a conservation measure pure and simple design to effect and actually affecting the prevention of underground actual physical waste and losses of oil.

Incidental to the prevention of waste, it becomes equally important to provide equitable participation in production and marketing by all producers.

You cannot make a person buy oil if he does not want it or when he does not want it, and the only way to stop unequal taking is to limit the production to what the market will absorb, whereupon the buyers will then reach out and make the connections with all unconnected wells in order to get the quantity of oil needed for their markets.

So I say that if the State intends to prevent the actual physical waste of oil and gas, it cannot accomplish this purpose unless it empowers some agency to bring about ratable taking, and no agency can bring about ratable taking by the exercise of its police power, unless it has the authority to limit the production in a pool to the market demand for the oil therefrom.

If it cannot bring about ratable taking, it cannot prevent physical waste entirely, because of the peculiar characteristics of oil and gas and the conditions under which they exist underground, and overproduction necessarily follows from the failure ratably to produce over the field as a whole.

The commission is authorized to allocate the total allowable production of crude in the State to the various fields, and also to prorate the production of each field to the various units within that field. By this law it is intended, under proration, to afford to the owner of each property in the pool an opportunity to produce his just and equitable share of the oil and gas in the pool. This law provides that no more wells shall be drilled then are reasonably necessary, so that each owner can secure, without waste, his proportionate part of the production of the pool. The establishment of proration units is provided for, a proration unit being an area which can be sufficiently and economically drained by one well. The pooling of properties or parts of units is permitted. Plans for proration or unit operation that are agreed upon by the operators of a pool may be adopted by the commission, and such proration plans have been approved for several fields. The 1929 law was in that regard replaced by this provision. The law defines legal oil and illegal, or "hot oil." The sale, purchase, acquisition, or handling in any other way of crude oil in excess of the amount set by the commission is prohibited.

In that particular, we now, of course, do not particularly need the Connally Act, but it has done a great deal of good and has been of great assistance, and we think it ought to stay in force and effect.

Mr. Cole. Did I understand you to say that you now did not have any particular need for it?

Mr. Dow. Well, insofar as our particular State is concerned, it can control production. In other words, the production of oil over and above the allowable set by the commission is illegal and that oil becomes illegal; and as long as it stays in the State and we can reach it, it can be confiscated; but the Connally Act is a great assistance, because if that oil moves beyond our jurisdiction we cannot reach it, and we want the Federal Government to help us out in that respect.

Mr. COLE. What you mean to say is that there is now no particular need for it?

Mr. DOW. I mean to say that insofar as State operations and State control within the borders of the State is concerned, we have the Connally Act in effect in New Mexico. That is to say, the oil produced in excess of the commission's allowables is illegal oil, and if it stays within the bounds of the State, we may seize and confiscate it; but as I understand the Connally Act——

Mr. COLE (interposing). That is true with practically every State, oil-producing State, is it not?

Mr. DOW. Well, I do not know about the other States.

Mr. COLE. I mean, their proration orders have that effect.

Mr. DOW. Up to a few years ago that had not been true, because these confiscation statutes started more or less recently, and the States, I think probably since the Connally Act was enacted, have all strengthened their position in that regard.

Of course, I do not say scrap the Connally Act. We need that insofar as assistance from the Federal Government is needed in that respect, but we could attempt, as long as the oil stays in the State and there is violation of our law, to handle the situation, and I think could handle it. In other words, if we could prevent it from going out of the State, but not when it goes out of the State into interstate commerce. But when it goes out of the State and becomes interstate commerce it would take the Connally Act to handle it.

The 1935 oil and gas conservation law provides for a tax on only one-eighth of 1 percent on the proceeds of all oil and gas produced for the purpose of meeting the expenses of the commission. This cost of administering the law since its enactment in 1935 to November 30, 1939, amounted to slightly less than 1 mill per barrel of oil produced.

The National Resources Committee makes the following statement:

> Among States one of the most complete sets of rules and regulations governing production and conservation of oil and gas is that established by the Oil Conservation Commission of New Mexico under the State laws. (Report of the Energy Resources Committee to the National Resources Committee, January 1939, p. 223.)

Many suggestions as to proper well spacing, casing programs, methods of well completions and general safety completion features have been solicited by the commission from New Mexico operators and incorporated in its rules and regulations pertaining to the drilling, completion and production of oil wells. Much credit for the common sense development program followed by operators in New Mexico can be attributed to the fine degree of understanding created between them and the oil conservation commission. No controversy of any moment has ever arisen between operators and the commission.

The statute has had far-reaching effects. Before passing to the specific nature of the statute, it is worthy of observation that its provisions put the stamp of approval upon operating practices and concepts of equity that had evolved naturally under a condition wherein the operators had had the opportunity of solving their problems cooperatively and under a minimum of legislative control. Economic exigencies have demanded fairly wide spacing, and New Mexico has become more or less a proving ground for the placing of single wells on 40-acre units. The operators had also been allowed to attack their many other problems of waste under a minimum of supervision, and it may be said that they did so in a vigorous fashion, attaining an operating efficiency that was noted throughout the industry.

I have said that a parallelism existed between New Mexico's oil history and the growth of her body of conservation law. Compared to the statutory evolution in other oil-producing States, no such parallelism can be found, and in this regard the 1935 statute was years ahead of its time.

Its main points of departure from existing laws elsewhere where its basis of allocation between the properties within a pool or field, the manner in which it dealt with unnecessary wells, and its specific treatment of the problem of wells located on fractional units.

With regard to allocation between properties within the pool, the law provides that: Subject to practicability and the limitations of waste, each property shall be allowed to produce substantially in proportion to its recoverable oil.

The second forward step, that relating to the drilling of unnecessary wells, was the pronouncement of the principle that no operator should be required directly or indirectly to drill more wells than reasonably necessary in order to secure his proper part of the production, and to this end provision was made for the fixing of proration units for each pool, such being the area which can be efficiently and economically drained by one well. The law stated further that the drilling of unnecessary wells is conducive to waste and increases unnecessarily the cost to the operator and hence to the ultimate consumer. The inclusion of these economic aspects is thoroughly sound from a waste standpoint, for it has been clearly demonstrated in other States that the drilling of an excessive number of wells in a pool invariably leads to an aggregate pool allowable above that necessary to the conservation of energy through the utilization of water drive. In connection with our uniform 40-acre spacing, it might be noted that whereas the New Mexico statute seeks to curb the drilling of unnecessary wells by the adoption of a 40-acre allocation unit for proration purposes, it will be remembered that the Petroleum Administrative Board placed the emphasis upon the cutting down of the number of wells drilled in any 1 year, regardless of the spacing pattern.

The third principle, dealing with pooling and the method of allocating to wells on tracts of smaller than unit size, authorizes both the pooling of properties where agreed upon and even the requiring of the same by the commission. In cases where such pooling should be neither authorized nor required, the allowable of a well drilled on such fractional units was to be limited to the relationship between its acreage and that of the unit.

All of the provisions cited would demand that allocations be based chiefly upon acre-feet or acreage, rather than upon potential or number of wells. The statute and the orders of the commission based thereon are ample for the prevention of waste. The legality of the statute has never been questioned, there has never been a case filed in any court in New Mexico challenging any order of the conservation commission or any provision of the New Mexico conservation statute.

Referring again to the National Resources Committee report, it is said (p. 201):

> Although State oil laws have been passed and sustained as conservation measures, their primary purpose, by and large, seems to have been stabilization of the industry.

Again (p. 186):

> From the social standpoint, regulation should require, or at least facilitate, the best production procedures throughout a field, and in no case should overproduction be allowed to depress prices unduly. When governmental action is taken to restrict production, the prices will rise, and it will pay operators to avoid some of the losses. Thus the existence of waste depends on price.

This statement made by a Federal Government representative is true in even a broader sense than implied. As used in the report, the idea is conveyed that the higher the price of crude oil, the greater the amount of money available in recovering each barrel, therefore the more oil can be recovered. That is, a greater amount of money for the purpose of putting into practice secondary methods such as repressuring and so forth.

Price also operates to produce waste in a more positive manner. Before proration, the price of crude oil was determined by supply and demand. In the State of New Mexico production in excess of demand is prohibited by statute as waste, and the conservation commission is obligated to curtail the supply when it is in excess of market demand. I quote from the statute:

> : The production of crude petroleum oil in this State in excess of the reasonable market demand for such crude petroleum oil is defined as waste (sec. 2–C, 1935 Stat.). The Commission is hereby empowered, and it is its duty, to prevent the waste prohibited by this act (sec. 9, 1935 Stat.).

Of course, any limitation of production, whether to an efficient economic rate of recovery from the reservoir or to reasonable market demand, does incidentally affect price. The maintenance of a balance between supply and demand for crude does tend generally to stabilize price and to prevent violent and inordinate fluctuations in price; but it does not fix price at any given level. Regulation production to market demand as estimated by the Bureau of Mines is not an artificial restriction of supply for the purpose of raising or fixing prices. It simply permits a more orderly market in which price is more stable than it might otherwise be, but in which the normal forces of free market, such as cost of production, increasing demand, or relative abundance in reserves, have full play in determining price.

And I contend the consumer benefits from a stable price of crude. For years he has enjoyed the steady but declining price and has not been harassed by violent or inordinate fluctuations in price.

Under proration, the supply is regulated, the demand is fixed by the estimate of the Bureau of Mines. So long as the State follows the estimate of the Bureau of Mines, and it has followed such estimates faithfully in allocating its daily production, a stable price should reflect a supply equal to demand. If, under regulated production, the State follows the Bureau of Mines estimate, but the price falls, then the supply is certain to be greater than the demand, and the conservation body of the State is obligated, under the law, to reduce the supply either gradually by reduced daily allowable, or abruptly by a shut-in.

Mr. Cole. May I interrupt at this time just to clear up something in my mind?

Mr. Dow. Yes, sir. Will you let me get in just one more sentence, if you please?

Mr. Cole. Very well.

Mr. Dow. If the supply exceeds the demand to such an extent that the price falls below the actual cost of production, then it is the statutory duty of the conservation body to act with dispatch, even to the extent of a complete shut-down of its fields, in order that the supply may be brought back to that basis which will afford a price sufficient to allow the continued operation of marginal wells, which otherwise would be, without question, prematurely abandoned. It is as imperative to avoid waste through premature abandonment as to hold production to market demand which is measured by price just as certainly now as when supply was not regulated.

And there is the answer for New Mexico shutting down in August 1939.

Mr. Cole. I am wondering—suppose you complete your statement.

Mr. Dow. No, go ahead. It is complete up to that point.

Mr. Cole. Is it correct that the price of California crude has just been cut for the first time since March 1936, the cuts ranging from 4 to 15 cents per barrel, averaging from $1.10 to $1.03?

Mr. Dow. How did you preface that question?

Mr. Cole. I am asking you if you have information to that effect.

Mr. Dow. No, sir; I do not know it.

Mr. Cole. It is correct, is it not?

Mr. Dow. I am not familiar with it if it is. Has it been recent?

Mr. Cole. Well, if that condition does exist in California, it would suggest a condition according to your paper which your committee would not approve for a minute.

Mr. Dow. Which what?

Mr. Cole. And evidently there is something wrong in California.

Mr. Dow. Well, of course, I refer to a fair and reasonable price; but I say this, that a low price which is at a time when there is overproduction or when production is exceeding the demand, absolutely spells impending waste of oil; and in the first place if it is below cost of production, it naturally is going to waste a lot of oil, because the operators are not going to spend money on secondary methods of recovering. They are going to be slovenly in the way they recover the oil from the field. That is the view I take of it in the matter of waste, both physical and economic.

Of course I do not make any bones about it. New Mexico is interested in economic waste. The State owns 42 percent of its oil and royalties from that oil go into the funds of the State institutions, and we are not going to sit by and see it taken at an unfair price.

Mr. Cole. What is the average crude price in New Mexico?

Mr. Dow. I think around from 80 cents to 86 cents and up. It is below Texas prices, some. I think our technical adviser will tell you all about that.

Mr. Cole. The drop in California, if I am correct in the reports I have before me, from $1.10 to $1.03 is quite substantial, is it not?

Mr. Dow. Well, I would say that it is quite substantial. I do not think that has probably affected us very much.

The report of the National Resources Committee (January 1939) is written principally, if not wholly, by Federal employees. Accusations are made in it, as just cited above, that State conservation bodies are interested in stabilization rather than conservation. Whatever the actuating motive of the State is or was, it is true and admitted in the citations just given, that stabilization, or fair price, is inescapably interwoven with the prevention of physical waste. It is true that proration has proved to be conservation, and that antiwaste measures have developed with the application of proration, so that now conservation is being practiced in full force in the State of New Mexico, even though the initial movement was proration.

The prosperity of the State is vitally dependent upon continued orderly conservation and sane development and production of our greatest natural resource—petroleum.

The industry is the largest and most important segment of our economy, and its well-being is, consequently, of prime importance to the whole State. The growth of the petroleum industry in New Mexico has been very rapid, evidence of which is found in Lea County. Whole cities have been built as a result of oil; miles of streets and highways, a new railroad, hundreds of new homes and business houses have been constructed; valuations have increased, and schools, unsurpassed in their magnificence, have been built in several oil-field towns.

Employment, directly and indirectly, is furnished for thousands. It is emphatically true that the industry has contributed heavily to meeting the cost of State, school, and local governments.

In years past, the principal land-office income was from grazing land and the livestock industry. During the past 10 years this income source has greatly diminished, until it is now but 12 percent of the total, while the income from the petroleum industry has risen to 82 percent of the total. The public schools and State institutions—University, A. and M., and other State schools—being the principal beneficiaries, have been able to expand their facilities and broaden their scope of training, all to the educational advancement of the State.

Through the severance tax, the petroleum industry contributes about 93 percent of the fund that goes to aid the poor, the aged, and the blind, the remaining 7 percent being contributed by the other industries, including potash, lumber, copper, silver, gold, and coal. Petroleum investments within the State have risen to 10 percent of the State's property value. It pays 100 percent of the conservation and production tax, 20 percent of the franchise tax, 25 percent of the sales tax, 93 percent of the severance tax, 40 percent of the income tax, 82 percent of the State land-office revenue, and will pay an estimated 50 percent of the new use tax.

The industry has grown within the State to the point that the State's tax revenue paid by it is double that paid by all railroads of the State; three times the amount paid by all town and city properties; more than three times the contribution of the livestock industry, formerly the backbone of the State's resources; nearly five times the amount paid by all the farms of the State; and more than four times the amount paid in taxes by the mining, public utilities, and merchandising industries combined.

The report of the National Resources Committee (p. 214), makes this statement: "The desire of the State to obtain tax income from the industry probably has led it to underestimate the importance of conservation of reserves." If the State placed taxation above conservation, it would be evident in one of the following ways: First, an abnormally high tax rate; second, allowable production with avoidable waste of reservoir energy, such as high gas-oil ratios; third, field allowables in excess of that rate necessary for the greatest ultimate recovery. As for New Mexico, its tax rate on petroleum and the petroleum industry is on a parity with other oil-producing States of like importance. It has handled high gas-oil ratio problems in the most logical, constructive, and helpful manner, to the end of holding avoidable waste to the minimum. Its record, and this will be brought out very clearly by Mr. Staley, or Mr. Andreas, a member of the Conservation Commission who will testify here, is shown to be far better than that of the Secretary of the Interior on Federal lands within the State under his sole jurisdiction, in the cases specifically cited by the Secretary in his appearance before your body. The State allowable has been held to conform with that recommended by the Bureau of Mines, and is restricted below the ability of the fields to produce. The Hobbs field, for instance, is now producing on a basis of one-half of 1 percent of its potential ability.

The effect which Federal control might have upon the stability of the oil industry would have a tremendous bearing upon the economic welfare of New Mexico.

New Mexico, through its accredited representatives, has participated in all meetings, preliminary and leading to the signing of the Interstate Oil Compact in Dallas, February 16, 1935.

The compact was signed while the 1935 legislature was in session, and that legislature ratified the compact and was the first legislature to ratify the Interstate Oil Compact. Immediately thereafter, the same 1935 legislature, without dissenting vote on the measure in either house of the legislature, enacted the 1935 consevation law. Thus, it will be seen that New Mexico promptly fulfilled its compact obligation to pass an adequate conservation measure, which it has strictly enforced.

It is earnestly believed that the proper method of handling the Nation-wide situation is by such an agency as the Interstate Oil Compact, rather than by Federal control.

And, I wonder if the chairman would permit me to make just a few comments on the report, which he read to the committee yesterday that was made to the Federal Power Commission.

Mr. Cole. May I ask you a question about your paper, before you proceed to that?

Mr. Dow. Yes, sir.

Mr. Cole. You have just stated that the Act of 1935——

Mr. Dow. Yes, sir.

Mr. Cole (continuing). New Mexico promptly fulfilled its compact obligations and has an adequate conservation measure.

The Act of 1935 authorized the commission.

Mr. Dow. Yes, sir.

Mr. Cole. That is 5 years ago.

Mr. Dow. Yes, sir.

Mr. Cole. To require the operation of wells for instance on a fixed gas-oil ratio.

Mr. Dow. Yes, sir.

Mr. Cole. But it took a long while to do that, did it not?

Mr. Dow. Well, you see, Mr. Chairman——

Mr. Cole. I say, it took quite a while to do that.

Mr. Dow. No, sir; we proceeded immediately.

Mr. Cole. You did not pass an order until just a few months ago?

Mr. Dow. We passed an order a few months ago, but we were dealing with that in dealing with individual wells and individual cases from the very beginning and as our technical adviser will state to you, the statement from the Secretary of the Interior in that respect was in error. There is no question about it.

Mr. Cole. Well, Mr. Dow, are you familiar with the various fields?

Mr. Dow. Yes, sir.

Mr. Cole. Suppose we take it so far as 1938 is shown in the report which was filed. That report gives the gas-oil ratios as shown in the various fields. Do you know the report to which I refer?

Mr. Dow. No, sir; I do not; but I do say, Mr. Chairman, that Mr. Andreas deals almost entirely with the subject from that point of view, and that is the reason I brought him here, because he is a member of the conservation commission, and I am not connected with the technical operations.

Mr. Cole. In November 1939, just last fall——

Mr. Dow. Yes, sir.

Mr. Cole. After these hearings started, the New Mexico Oil Conservation Commission issued a notice of a public hearing.

Mr. Dow. Yes, sir.

Mr. Cole. To be held in Santa Fe on December 9, 1939, to consider——

Mr. Dow (interposing). I am familiar with that.

Mr. Cole. To consider the adoption of regulations governing oil-gas ratios in various producing fields in New Mexico, and I am wondering if under the act of 1935, if that is not the first action of the kind taken by the commission.

Mr. Dow. Yes, sir. I will say to you, frankly——

Mr. Cole. That is all I wanted to ask.

Mr. Dow. I do not know why they did not pass it before; but then I think they have attended to the job.

As I stated, I brought the man here to tell you all about that.

Mr. Cole. Do you know Mr. R. S. Christie of the Amarado Petroleum Corporation?

Mr. Dow. I possibly have met him, Mr. Chairman. I have met a good many of these people, but I cannot say that I know him.

Mr. Cole. He is chairman of the committee of five engineers, is he not?

Mr. Dow. I am not familiar with that committee of engineers. I do not know about it.

Mr. Cole. You have covered practically the whole field here in your paper, and I am wondering if we are not a little out of order in presenting this State problem.

Mr. Dow. No; I think not. The purpose of my paper was to give the background.

Mr. Cole. All right, sir.

Mr. Dow. To the testimony that is to follow.

Mr. Cole. Have you that report with you, or is it available here to be filed with the committee, the report by Mr. Christie on behalf of the committee of engineers?

Mr. Dow. Is it here, Mr. Staley?

Mr. Staley. How is that?

Mr. Cole. A committee appointed by Mr. Staley. You have a copy of that report?

Mr. Staley. I have one here at the hotel.

Mr. Dow. He has one at the hotel. I will ask him to get it now, or to send for it.

Mr. Cole. I would like to have it filed later as a part of the hearings.

Do you regulate at all, Mr. Dow, under your present law the output of gas in New Mexico? Is there any regulation as to the production of natural gas produced from gas wells, as to what shall escape into the air? Or is there any regulation at all of that kind?

Mr. Dow. I do not know what the commission has actually done in that respect.

Mr. Cole. If you do not know, you cannot answer that.

Mr. Dow. No, sir; I do not know.

As I stated to you, Mr. Chairman, I am not an official connected with the commission in any way; but I have represented the State on the Interstate Oil Compact Commission, and have kept closely in touch with the situation as was possible under the circumstances.

Mr. Cole. Are you familiar with the article on pressure maintenance which appeared in the engineering reports on the Lea County operators, February 8, 1939?

Mr. Dow. I am not familiar with it. I think I read that report. I have the report in my office, but I do not think I am familiar with its details.

Mr. Cole. Which deals entirely with the avoidance of excess gas-oil ratios.

Mr. Dow. Yes, sir.

Mr. Cole. Do you know whether that report is available?

Mr. Dow. I think it is available. Do you have the operators' committee's report?

Mr. Staley. I do not have it here.

Mr. Dow. It can be made available. We do not seem to have it here.

Mr. Cole. I would like to have that report filed.

Are you familiar with the facts leading up to the shut-down, or the conditions leading up to the shut-down order issued August 22, 1939?

Mr. Dow. Well, except in a general way as any other citizen would be familiar with it. I did not happen to be the representative of the State at the meeting of the Oil Compact Commission in Oklahoma City. Both the representative of Colorado and myself happened to be engaged in the trial of a case in the Federal court in New Mexico at that time and neither one of us attended the meeting.

Someone else will follow me and give the reason for the shut-down order in New Mexico. Mr. Andreas will follow me. I think he knows the reason of course, for the shut-down order, but that is my opinion.

There are a few remarks I would like to make in regard to the Federal Power Commission report.

As I reviewed the conclusions the first charge in that report was that the States either individually or through compact cannot properly conserve or prevent waste of oil or gas.

I think the record furnished the Cole committee shows that States are moving toward conservation as rapidly as knowledge and science shows the way. The record also shows that State conservation is equal or superior to conservation on Federal lands. States have practiced conservation through adequate laws but a few years. The Federal Government has needed no laws as its rules have been law for many years. Yet it has not surpassed the accomplishment of the States.

Now, the second charge is that the history of the compact shows nothing has been accomplished in conservation, prevention of waste, or in improvement in conservation laws.

The members of the Compact Commission have worked untiringly with other States, and it is largely through their work that the States of Arkansas, California, Mississippi, and Kentucky have passed conservation laws. Of course California's law was defeated in a referendum, but the legislation was passed and that was largely through the work of the members of the Compact Commission. But, the main thing is that the compact idea has changed the States' attitude from unfriendly rivalry to friendly cooperation and has brought about the holding of production to the limit set by the Bureau of Mines' estimates.

The chairman of this committee (Mr. Cole) was in the first meeting at Ponca City in 1934. I had the honor of meeting you there, Mr. Chairman. At that time no two representatives of any States could get together and talk with each other without harboring in their mind distrust of what the other was saying and suspicion and for several months that attitude permeated the atmosphere every time we had a meeting; but through the working of the interstate oil compact and the friendliness engendered among the membership of the regulatory bodies, and it has been the practice of practically all the members, or of each member of the Compact Commission to take with him to those meetings all, or as many as he could of the members of the regulatory body of his State so that it is not the representatives who meet there, but the members of the regulatory bodies of the States themselves.

We have no big force in New Mexico, technical force, yet there has been made available to us every bit of information that Texas has with its large force of experts; every bit of information that Oklahoma has with its force; and the same with Kansas; and the friendliness and cooperation which that compact has engendered will live forever, because if it has done nothing more than bring the States to an understanding that the problem can be attacked in a friendly manner and discussed and solved in that way, I think it will have accomplished much.

The charge is further made that Illinois, once a member, dropped out when production mounted and have not passed adequate conservation laws.

I stated that, Mr. Chairman, that Illinois will learn as other States have learned through the best teacher, experience. Judged by other States the time will be short, and the waste of no consequence compared with the total available reserves.

Mr. Kelly. When did Illinois join that compact?

Mr. Dow. It joined in the very beginning, and it is a member, and has had representatives attending all of the hearings from the initial hearing except the last few.

Mr. KELLY. When did Illinois drop out; how long has Illinois been out?

Mr. DOW. They never, to my knowledge, have effectively dropped out. They have always had a representative at the compact meetings until the last few, two or three, I think.

Mr. KELLY. They have not attended the last three or four meetings?

Mr. DOW. I think that is true. Mr. William Bell used to come regularly and then Dr. Bell came regularly, and I do not recall now the name of the other gentleman who came, but they attended and gave us the picture in Illinois, and it has only been the last three or four meetings, as I say, that they have not attended.

Mr. COLE. The compact provides that the signatory States executing this agreement in "a single original, which shall be deposited in the office of the Department of State of the United States."

Mr. DOW. That is true.

Mr. COLE. And a duly certified copy thereof with the Governor of each of the signatory States.

The State Department has obtained no information indicating that the State of Illinois or any other State has passed a resolution to join the interstate compact.

Mr. DOW. Or any other State?

Mr. COLE. No.

Mr. DOW. Now, I will tell you that I furnished the Secretary in the first instance——

Mr. COLE (interposing). My information is that the State of Illinois has not. I know that some other States have. Did the State of Illinois pass a resolution to join the compact?

Mr. DOW. My understanding was during the first period of the compact when it was first authorized by Congress, that Illinois was an official member and I am sure it was, because representatives were there and voted; but it is possible that they did not renew this last time when we asked that the compact be renewed. I do not know about that; but I know in the beginning Illinois was an official member.

Mr. COLE. Of course, I am speaking of the 1939 compact.

Mr. DOW. Well, of course, on the renewal in 1939, I do not know whether Illinois renewed or not.

Colonel THOMPSON. We have a telegram that they did renew.

Mr. DOW. That is my understanding at the time, that they did renew. That is the reason I made the statement; but I do not know what the archives show in that regard.

I fear we may lose our sense of proportion if we are not careful about Illinois, because of the great emphasis that is being placed on Illinois. The total known reserves of that State is approximately 500,000,000 barrels or about 3 percent of the total reserves for the country. The great bulk of the reserves are located in those other States, having and administering effectively adequate conservation laws by which the production is controlled, and waste fairly well prevented.

The Nation consumes 3,500,000 barrels daily. The total reserves in Illinois will supply this demand for only 140 days or less than 5 months. To sell out the birthright of a State's sovereignty, free enterprise, and the fundamental principle of Americanism, in order to prolong for a few days this change-over to other fuels, of which there is an abundance, is to sell our liberty for nothing. I am confident the State of Illinois will shortly meet its problem. Other States, one by one, met their problems in this regard.

The conservation program is comparatively new and it is taking time, but within the last 5 years progress has been continuous and, in the final analysis, amazing. In the short period of a decade this whole conservation program has been accomplished. It has been settled and is being accomplished.

The next charge is that the compact has no authority, no power, and no means of enforcing anything—cannot compel membership of States.

I feel in answer to that that we should recall to our mind that this Nation came into being in resisting a government which was endowed with the power and authority that the compact does not have. I do not believe in coercion, and I do not believe that any State in this Nation can be coerced into doing something that it does not want to do, but I believe that everything can be accomplished through friendly cooperation and especially in the midst of the spirit that has been engendered and now exists among the compact States.

The Constitution was formed to further cooperation between the States and to insure States' rights which rise above the necessity of prolonging for a few days the time when their citizens may have to shift to a less convenient fuel. Under 5 years of the compact, conservation has advanced to a greater degree than through all of the time before, since the discovery of oil.

The next charge is that the States are powerless to accomplish anything under the interchange of information, ideas, or suggestions.

Well now, let me say here, the Cole bill gives the industry no right of representation other than an advisory council which—and I quote:

> Shall arrange for an effective current interchange of information between its members and the Office of Petroleum Conservation as to production methods and practices which will tend to effect the conservation of petroleum.

The charge of the Power Commission might be true, if cooperation between the Governor and the governed were in effect (as is undoubtedly true) under the provisions of the Cole bill, yet cooperation between the States has led to a better understanding, the passage of better conservation laws, and to a better enforcement of such laws.

The next charge is that oil and gas are migratory and do not respect State lines. Only method of solving this problem effectively, impartially, and definitely is through Federal legislation.

The compact has brought about friendly cooperation between States so that common pools have been made common problems and solved with uniformity of results.

The next charge is that unitization is the most feasible, economic, and fair method of operation; that returns are shared in proportion to acreage development in orderly manner; feverish drilling is absent; wells are equally spaced and operated, assuring lengthened producing life.

New Mexico's answer to that is that none of the foregoing is unattainable under the New Mexico law, and its method of enforcing the benefits of integration are available to all operators with none of its disadvantages. Free enterprise is assured. Operation is economical, allocation is on an acreage basis, principal development is orderly, feverish drilling is a thing of the past, and spacing is uniform. There is no advantage gained by integration of Federal land in the State in any of the angles mentioned.

I thank you.

Mr. COLE. Thank you, Mr. Dow.

(The exhibits above referred to follow:)

SPECIAL RULES AND REGULATIONS FOR THE LEA COUNTY FIELDS, NEW MEXICO

STATE OF NEW MEXICO, OIL CONSERVATION COMMISSION, CIRCULAR NO. 3, ISSUED BY THE OIL CONSERVATION COMMISSION, FEBRUARY 1, 1937

(Oil Conservation Commission: Governor John E. Miles, Chairman, A. Andreas, State Geologist, Frank Worden, Commissioner of Public Lands, Secretary)

NEW MEXICO OIL CONSERVATION COMMISSION, ORDER NO. 52

Special Rules and Regulations for the Lea County Fields, New Mexico

EXPLANATION

These special rules and regulations for the Lea County fields, New Mexico, were adopted by the Commission December 30, 1936, and became effective February 1, 1937. They include the rules and regulations of the Commission in Circular No. 2, "Special Rules and Regulations for the Hobbs, Jal, Cooper, and Monument Fields, Lea County, New Mexico," that have been retained by the Commission. Modifications and additions have been made, and these special rules and regulations now apply to all the Lea County fields, with the exception of the part of the Maljamar field that is in Lea County.

GENERAL RULES AND REGULATIONS

The general rules and regulations of the New Mexico Oil Conservation Commission in Circular 1, "Oil and Gas Conservation Law and General Rules and Regulations for the Conservation of Oil and Gas in New Mexico," shall apply to all present and all future wells in the Lea County fields, except as such rules and regulations are modified or amplified herein to meet the special conditions in the various Lea County fields and to control and prevent waste in those fields.

SCOPE OF SPECIAL FIELD RULES

The special rules and regulations for the Hobbs field contained herein shall be limited in their application to the present 4200-foot productive horizon, and for the other Lea County fields to the horizons now producing.

DEVIATION TESTS

When the deviation from vertical in any 500-foot interval averages more than 5° the hole shall be straightened.

STRATIGRAPHIC MARKERS IN THE HOBBS FIELD

The average depths at which the various stratigraphic markers in the Hobbs pool may be expected are as follows:

	Feet
Potable Water	90
Top of Anhydrite	1, 550
Top of Salt	1, 700
Base of Salt	2, 650
Top of Brown Lime	2, 775
"Bowers" Sand	3, 200
"Big Gas" Sand	3, 700
"Sandy Dolomite"	3, 975
"White Crystalline Lime"	4, 025

CASING AND CEMENTING PROGRAMS FOR THE HOBBS FIELD

Casing programs for the Hobbs pool shall consist of (A) a surface casing string, (B) an intermediate casing string, except as hereinafter provided, and (C) a production casing string.

A. *Surface Casing String.*—In order to protect the fresh-water supply, the surface casing string shall be set at least 10 feet into the "Red Bed" section and cemented back to the bottom of the cellar.

B. *Intermediate Casing String.*—The intermediate casing string, if required, may consist of either (1) a short string, or (2) a long string, at the option of the operator.

1. The short string, if used, shall be set in the Rustler formation above the top of the main salt and shall be cemented with 150 percent of the calculated amount of cement to fill back to the bottom of the cellar.

2. The long string, if used, shall be set at least 100 feet below the base of the salt and cemented with 150 percent of the calculated amount to fill back to the bottom of the cellar.

The intermediate string may be dispensed with, only by special permission of the Commission, in wells where the "Brown Lime," "Bowers Sand," and "Big Gas" horizons have, by adequate and satisfactory proof, been found to contain neither oil nor gas.

C. *Production Casing String.*—The production string shall be set and cemented below the top of the "Sandy Dolomite." Where a short intermediate string is used, the production string shall be cemented with 150 percent of the calculated cement to bring it to the base of the salt. Where a long intermediate casing string is used, the production string shall be cemented with 150 percent of the calculated amount to fill back to above the top of "Bowers" sand.

Where no intermediate string is used the production string shall be cemented with 150 percent of the calculated amount required to fill back to bottom of cellar.

CASING AND CEMENTING PROGRAMS FOR LEA COUNTY FIELDS EXCEPT THE HOBBS FIELD

Casing programs for the Lea County Fields, except Hobbs shall consist of: (A) A surface casing string, (B) an intermediate casing string, and (C) a production casing string.

A. *Surface Casing String.*—The surface casing string shall consist of (1) a string of sufficient length to shut off all potable surface waters, which shall be carried at least 15 feet into the "Red Beds," and which shall be cemented to the surface; or (2) a conductor of one to three joints of casing which shall either be pulled or cemented to the surface.

B. *Intermediate Casing String.*—Inside of the surface casing string (1) a short intermediate string of casing shall be set in the top of the main salt, or (2) a long intermediate string shall be set through the salt as follows:

1. A short string shall be set in the top of the main salt and below the Rustler formation. At the Eunice and Monument fields this string may be set in the Rustler anhydrite. If the surface casing string has been carried 15 feet into the "Red Beds," this intermediate string shall be cemented with 200 percent of the calculated amount to bring the cement to the bottom of the surface casing string. If the surface casing string consists only of a conductor of one to three joints, this intermediate string shall be cemented to the surface. If the cement fails to reach the surface, the intermediate string shall be perforated just above the top of the cement and an additional cement job done which shall bring the cement to the surface.

2. A long string of casing shall be run through the salt and at least 25 feet below it. This string shall be cemented with a two-stage cement job. The lower stage shall be cemented with at least that amount of cement which theoretically would bring the cement 200 feet above the casing shoe. The upper stage shall be cemented from the top of the salt and just below the Rustler formation with 200 percent of the calculated amount to bring the cement to the bottom of the surface casing string. If the surface casing string consists only of a conductor of one to three joints, this upper stage shall cement the string to the surface. If the cement fails to reach the surface, the intermediate string shall be perforated just above the top of the cement and an additional cement job done which shall bring the cement to the surface.

If desired, where the surface casing string has been set in the "Red Beds," the long string through the salt may be cemented with a one-stage job, using 150 percent of the calculated amount to bring the cement 200 feet above the top of the salt. If the surface casing string consists of a conductor of one to three joints the long intermediate string, when cemented with a one-stage job, shall be cemented to the surface. If the cement does not reach the surface, the pipe shall be perforated just above the top of the cement and an additional cement job done that shall bring it to the surface.

C. *Production Casing String.*—The production string of casing shall be set either on the top of or within the producing zone. It may be perforated if necessary. The production string shall be cemented as follows:

1. If the intermediate string is set at the top of the salt, the production string shall be cemented with 150 percent of the amount calculated to bring the cement to the base of the salt. Mud shall be circulated ahead of the cement.
2. If the intermediate string is set through the salt, the production casing string shall be cemented with 150 percent of the calculated amount to bring the cement to the bottom of the next larger intermediate string.

SPECIAL CASING PROGRAMS

At wells where the above regulations are not applicable because of exceptional conditions, the Commission may approve special casing programs upon request and provided adequate proof is submitted to justify such special programs and to assure the prevention of waste.

CASING TESTS FOR ALL FIELDS

The surface casing string shall be tested after drilling plug by bailing the hole dry. The hole shall remain dry for one hour to constitute satisfactory proof of a water shut-off. The surface casing shall stand cemented at least 36 hours before drilling plug. The conductor string of one to three joints need not be tested after cementing.

The intermediate string shall stand cemented not less than 48 hours before testing pipe and cement. Tests of pipe and cement shall consist of building up a pressure of 1,000 pounds, closing valves, and allowing to stand 30 minutes. If the pressure does not drop more than 100 pounds during that period, the test shall be considered satisfactory. This test shall be made both before and after drilling plug.

The production string shall stand cemented not less than 48 hours before testing casing. This test shall be made by building up a pressure of 1,000 pounds, closing valves, and allowing to stand 30 minutes. If the pressure does not drop more than 100 pounds during that period, the test shall be considered satisfactory.

All cementing shall be done by the pump and plug method, except that this method shall be optional for a conductor of one to three joints.

Bailing tests may be used on all casing and cement tests and drill stem tests may be used on cement tests, in lieu of pressure tests. In making bailing tests, the well shall be bailed dry and remain approximately dry for 30 minutes.

If any string of casing fails while being tested by pressure or by bailing tests herein required, it shall be recemented and retested, or an additional string of casing shall be run and cemented. If an additional string is used, the same tests shall be made as outlined for the original string. In submitting Form C–101, "Notice of Intention to Drill," the number of sacks of cement to be used on each string of casing shall be stated.

TUBING

All flowing wells shall be tubed. The tubing shall be set as near bottom as practicable, but in no case shall tubing perforations be more than 250 feet from bottom. The bottom of the tubing shall be restricted to an opening of less than one inch or bull-plugged in order to prevent the loss of pressure bombs or other devices

SURFACE EQUIPMENT

Meter settings of adequate size to measure efficiently the gas shall be installed on the gas vent line of every flowing well.

Well-head equipment shall be installed and maintained in first-class condition so that static bottom hole pressures may be obtained at any time by a duly authorized agent of the Commission. Valves shall be installed so that pressures may be readily obtained on both casing and tubing.

SAFETY REQUIREMENTS

Blowout preventers shall be installed on the intermediate string and oil string of casing prior to drilling plugs, and shall be tested against pump pressure at least once every 24-hour period while drilling is in progress.

All connections subject to well pressure and all well-head fittings shall be of first-class material, rated at 1,500 pounds working pressure and maintained in gas-tight condition. Bradenheads rated at 1,500 pound working pressure shall be installed on all intermediate and oil casing strings, and Bradenhead connections maintained in gas tight condition. There shall be at least one valve on each Bradenhead.

While drilling wells in under pressure, an oil circulation pit or tanks shall be maintained at least 60 feet from the well.

Drilling boilers shall not be set closer than 200 feet to any well or tank battery. All electrical equipment shall be in first-class condition and properly installed.

Burning pits shall not be located closer than 200 feet from any stock tank or battery, or drilling or producing well.

BRADENHEAD GAS

Bradenhead gas shall not be used either directly or expansively in engines, pumps or torches, or otherwise wasted. It may be used for lease and development purposes and for the development of nearby leases, except as prohibited above.

Wells shall not be completed as Bradenhead gas wells unless special permission is obtained from the Commission.

GAS LIFT

Gas lift shall be used in regular production practice only after application to and approval by the Commission.

CHEMICAL TREATMENT OF WELLS

The portions of Rule 7, "Shooting and Chemical Treating of Wells," and Rule 24, "Notice of Intention to Shoot or Chemically Treat Wells" (Form C–102), of the general rules and regulations, which relate to obtaining the permission of the Commission to chemically treat wells, shall not be required in the Lea County Fields.

METHOD OF PRODUCING FLOWING WELLS

Naturally flowing wells shall be produced at a continuous uniform rate as far as is practicable, in keeping with the current allowable, unless the Commission specifically permits stop cocking to reduce the gas-oil ratio.

PRODUCTION FROM UNITS

The production of crude oil from each 40-acre unit shall be the amount allocated by the Commission. An accurate record of the oil production from each unit or well shall be obtained and reported to the Commission according to its requirements.

CENTRAL TANK BATTERIES

(The following matter was adopted by the Commission, July 26, 1937 in paragraph D, Order No. 72, Case No. 8, effective August 1, 1937:)

At the option of the operator a central tank battery may be used to receive the production of two to not more than five units of the same basic lease. Exceptions to be made at the discretion of the Commission. Such central tank battery shall include adequate tankage and other equipment so that the production from each well can be accurately determined at reasonable intervals.

REQUIREMENTS FOR "OPERATORS' MONTHLY REPORT OF OPERATIONS" IN THE LEA COUNTY FIELDS

For all units in the Lea County fields producing oil and/or gas, including Government units, a report shall be required on Form C–104–A, "Operators' Monthly Reports of Operations (Lea County)," instead of on Form C–104. This report shall be for each calendar month and shall be submitted before the 25th day of the succedding month. It shall be made out in quadruplicate except as noted below. The original and one copy shall be submitted to the Commission, one copy to the Lea County Proration Office at Hobbs, and one copy to the pipe line company running the oil. A separate form shall be required for each basic lease except as noted below.

Reports on drilling wells located on leases that are producing oil and/or gas, shall be included with production reports on Form C-104-A. Drilling reports shall include for each well the location including the 40-acre tract, well number, progress during month, depth at end of month, and number of days during which drilling operations were conducted. For wells at which drilling operations were discontinued, the cause shall be given.

Reports for drilling wells on nonproductive basic leases may be made in triplicate on either Form C-104 or C-104-A, and copies should be sent only to the Commission.

For wells producing oil, the report shall give for each well the location including 40-acre tract, well number, net barrels of oil produced, net barrels of oil run to pipe line, and gravity of the oil. For wells producing oil and water the report shall give for each well the barrels of water produced and the percentage of water.

The method used in determining water shall be stated. The report shall state the number of days each well produced, and if a well was shut down that shall be stated and the cause of the shut-down given. The method of operating, whether flowing, pumping or gas lift, shall be indicated. The total production of oil from the lease or group of wells reported on a separate form shall be divided into pipeline runs, amount from or to lease storage, local sales, amount used in developing or operating the lease, and any miscellaneous dispositions. The sum of the dispositions shall balance the total production.

The report shall state whether the wells included discharge the oil into separate tanks or a central tank battery. A separate form shall be required for each group of wells that discharge into a central tank battery, and on such report the total pipe-line run shall be distributed among the individual wells in proportion to their production during the month, which production shall be accurately determined.

For all wells producing gas, the report shall give for each well the total amount of gas produced in thousands of cubic feet, and the gas-oil ratio or cubic feet of gas per barrel of oil. If gasoline was extracted from the gas, the report shall give the gallons of gasoline recovered and sold, and the estimated gallons of gasoline per thousand cubic feet of gas. The gas delivered to the gasoline plant may be less than the total production. If any gas wells were shut down that shall be stated, and the cause of the shut-down shall be given. The total gas production of the lease or group of wells reported on a single form shall be divided into the amount used on the lease, amount sold, amount blown into the air or burned, and any miscellaneous dispositions. The total amount of gasoline obtained from the gas shall be segregated according to the dispositions made. If reports on gas or gasoline are not available in time for inclusion on Form C-104-A, figures for the last month for which they are available should be given, and the correct month should be indicated.

For wells producing oil and gas, data as outlined above shall be given for both oil and gas.

Reports on Form C-104-A shall be subscribed and sworn to by a responsible employee of the company before a Notary Public.

EUNICE-MONUMENT FIELDS DIVISION LINE

(The following matter was adopted by the Commission July 26, 1937, in paragraph B, Order No. 72, Case No. 8 and became effective August 1, 1937:)

That the matter of the division line between the Eunice-Monument fields be as follows:

The southern boundary of the Monument field shall be the northern boundary of Eunice field, the division line between the two said fields shall be: an east-west line running one-quarter mile south of the north line of the following sections: Sections 23 and 24, Township 20—South, Range 36—East, N. M. P. M. and Sections 19, 20, 21 and 22, Township 20—South, Range 37—East, N. M. P. M.

UNIT FOR PRORATION PURPOSES IN ALL LEA COUNTY FIELDS

(The following matter was adopted by the Commission, July 26, 1937 in paragraph C, Order No. 72, Case No. 8 and became effective August 1, 1937:)

That the unit for proration purposes in all Lea County fields shall be the legal subdivision of 40-acres more or less, or lot of 40-acres more or less, as defined and determined by the official plats of the United States Government surveys.

All prior orders or portions thereof insofar as they are in conflict with the unit for proration provided for herein, shall be revoked as of the effective date provided for hereinbelow. (The effective date referred to in Order 72, Case No. 8 is August 1, 1937.)

RULES AND REGULATIONS FOR CARBON DIOXIDE FIELDS IN THE STATE OF NEW MEXICO

NEW MEXICO OIL CONSERVATION COMMISSION, CIRCULAR NO. 4, ISSUED BY THE OIL CONSERVATION COMMISSION, JULY 1, 1937

(Oil Conservation Commission, Governor Clyde Tingley, Chairman, G. D. Macy, State Geologist, Frank Worden, Commissioner of Public Lands, Secretary)

New Mexico Oil Conservation Commission Order No. 67

Rules and Regulations for Carbon Dioxide Fields in the State of New Mexico

EXPLANATION

These general and special rules and regulations for the Carbon Dioxide fields, in the State of New Mexico, were adopted by the Commission June 26, 1937, and became effective July 1, 1937.

GENERAL RULES AND REGULATIONS

The general rules and regulatious of the New Mexico Oil Conservation Commission in Circular 1, "Oil and Gas Conservation Law and General Rules and Regulations for the Conservation of Oil and Gas in New Mexico," shall apply to all present and all future wells in the Carbon Dioxide fields in the State of New Mexico, except as such rules and regulations are modified or amplified herein to meet the special conditions in the various fields and to control and prevent waste in these fields.

BONDING REQUIREMENTS

Before Form C–101, "Notice of Intention to Drill," is granted or approved by the Oil Conservation Commission, it will be necessary for the operator to have on file with the Oil Conservation Commission an approved and accepted corporate surety bond in the principal amount of $5,000.00 for an individual well or a blanket corporate surety bond in the principal amount of $10,000.00 where the operations cover more than one well. Each such bond shall be executed by a responsible surety company authorized to transact business in the State of New Mexico.

When the well or wells involved, or any such wells, are located on a State oil and gas lease, and the surface of the land involved was sold by the State prior to such oil and gas lease, such bond may, at the election of the principal, be conditioned not only for the plugging of such well or wells as above provided, but also to secure the payment for such damages to the livestock range, water, crops, or tangible improvements on such land as may be suffered by such purchaser or his successors in interest by reason of the development, use, and occupation of such land resulting from such oil and gas leases.

Any bond conditioned as provided in the last preceding sentence must be approved, not only by the Commission, but by the Commissioner of Public Lands in his capacity as such.

All liability on bonds conditioned for the plugging of a well or wells shall continue until the plugging of such well or wells is completed and approved. Bonds conditioned to protect surface owners as aforesaid shall cover liability incurred during the entire period of oil and gas operations by the principal on the lands involved.

The Commission will, in writing, advise the principal and sureties on any bond conditioned to plug wells, as to whether the plugging is approved, in order that, if the plugging is approved, liability under such bond may be formally terminated.

Forms of bonds which will be acceptable will be furnished by the Commission.

PRODUCTION UNITS AND SPACING REGULATIONS

The production unit for the Carbon Dioxide fields is hereby established as a 40-acre tract or lot as determined by U. S. Government surveys, and no wells shall be drilled in excess of one to each such tract and no location shall be made closer than 330 feet from any two of the boundary lines of such subdivisions.

WRITTEN NOTICES, REQUESTS AND REPORTS

Written notices, requests and reports shall be required by the Oil Conservation Commission provided for in Circular 1 of the Commission, Rules 21 to 38, inclusive. Forms to be used in this connection, to be furnished by the Oil Conservation Commission, include:

First-Surety Bond (See "Bonding Requirements," Page 3.
Form C–101. Notice of Intention to Drill.
Form C–102. Miscellaneous Notices.
Form C–103. Miscellaneous Reports on Wells.
Form C–104. Operator's Monthly Report of Operation.
Form C–105. Well Record.
Form C–106. Request for Permission to Connect with Pipe Line.
Form C–107. Purchaser's Monthly Report.

In the case of wells on lands belonging to the United States copies of notices and reports to the proper officials of the United States will be accepted in lieu of these forms.

CASING TESTS FOR ALL FIELDS

The surface casing string shall be tested after drilling plug by bailing the hole dry. The hole shall remain dry for ten hours to constitute satisfactory proof of a water shut-off. The surface casing shall stand cemented at least 36 hours before drilling plug. The intermediate string shall stand cemented not less than 48 hours before testing. The hole shall remain dry for ten hours to constitute satisfactory proof of a water shut-off. This test shall be made both before and after drilling plug. The production string shall stand cemented not less than forty-eight hours before testing. The hole shall remain dry for ten hours to constitute satisfactory proof of a water shut-off. This test shall be made before drilling plug and also after drilling plug, if practicable.

All cementing shall be done by the pump and plug method.

Bailing tests shall be used on all casing and cement tests. In making bailing tests, the well shall be bailed dry and remain dry for approximately ten hours.

If any string of casing fails while being tested by bailing tests herein required, it shall be recemented and retested, or an additional string of casing shall be run and cemented. If an additional string is used, the same tests, shall be made as outlined for the original string. In submitting Form C–101, "Notice of Intention to Drill," the number of sacks of cement to be used on each string of casing shall be stated.

SPECIAL CASING PROGRAM

At wells in the Carbon Dioxide fields of the State of New Mexico where the general and special rules and regulations are not applicable because of exceptional conditions, the Commission may approve special casing programs upon request and provided adequate proof is submitted to justify such special programs and to assure the prevention of waste.

SURFACE EQUIPMENT

Meter settings and recording meters of adequate size to measure efficiently the gas produced shall be installed by the operator on each and every producing well. These meters shall be subject to check at all times by the Oil Conservation Commission.

Wellhead equipment and suitable pressure guages shall be installed and maintained in first-class condition at all times. All wellhead equipment consisting of the following: one master gate installed in cellar, one high pressure 2-inch gate installed at wellhead and such other equipment and connections and surface lines that the Oil Conservation Commission shall deem necessary, which shall test over 1000 pounds working pressure and be subject to the inspection and approval of the Oil Conservation Commission at all times.

All plant plans and designs, plant equipment and connections in present plants in this field and in any future plants which may be constructed shall be subject to the inspection by and the approval of the Oil Conservation Commission.

DEVIATION TESTS

When the deviation from vertical in any 500-foot interval averages more than 5 degrees the hole shall be straightened.

CONFLICTS BETWEEN GENERAL AND SPECIAL RULES AND REGULATIONS

In case of conflict between a general and a special rule or regulation, the special rule or regulation shall prevail without regard to the effective dates of the respective rules or regulations, unless the contrary is clearly prescribed by the Commission. (Rule 41, of Circular No. 1—General Rules and Regulations for the Conservation of Oil and Gas in New Mexico.)

SPECIAL RULES AND REGULATIONS FOR THE BUEYEROS FIELD, HARDING COUNTY, NEW MEXICO

CASING AND CEMENTING PROGRAMS

Commercial producing horizons in the Bueyeros field as determined by present drilling are between the approximate depths of 800 feet to 1,000 feet and 1,500 feet to 2,100 feet.

In order to protect these horizons and the various waters encountered, the following casing and cementing programs shall be followed:

Casing programs for the Bueyeros field shall consist of (A) a surface casing string. (B) an intermediate casing string, except as hereinafter provided, and (C) a production casing string.

A. *Surface Casing String.*—In order to protect the fresh-water supply, the surface casing string shall be set at least 10 feet below any water encountered under 300 feet and cemented back to the bottom of the cellar.

B. *Intermediate Casing String.*—The intermediate casing string, if considered necessary by the Oil Conservation Commission shall be set below the first commercial producing horizon and shall be cemented with 150% of the calculated amount to bring cement to the bottom of the surface string.

C. *Production Casing String.*—The production casing string shall be set and cemented on the top of or in the producing horizon, as ordered by the Oil Conservation Commission. This string shall be cemented with 150% of the calculated amount to bring the cement to the bottom of the next larger string. The present known thickness of the first commercial horizon is approximately 50 feet and the second known horizon between 50 feet and 100 feet. In no case shall the operator drill more than two-thirds of the distance through the horizon he intends to produce from.

OIL AND GAS DEVELOPMENT IN NEW MEXICO IN 1937

By. E. H. Wells,[1] Member A. I. M. E., and A. Andreas [2]

New Mexico retained its position as the sixth largest oil-producing state for the year 1937 with a total production of 38,484,630 bbl. This was an increase of 11,680,184 bbl. over the 1936 production of 26,804,446 bbl., or a gain of 43 percent.

The production for Lea County during 1937 was 35,961,056 bbl.; for Eddy County, 2,136,251, bbl.; and for northwestern New Mexico (San Juan and McKinley Counties), 387,323 bbl. The average daily nonmarginal well allowable for Lea County on Jan. 1, 1937, was 92 bbl.; at the close of the year it was 67 bbl. The average daily pipe-line runs were less than the allocations of the New Mexico Oil Conservation Committion, but slightly in excess of the state allowables recommended by the United States Bureau of Mines. The average daily production for the year was 105,437 barrels.

The total number of completions in the state was 742, of which 638 were oil wells; 19 hydrocarbon gas wells; 5 carbon dioxide gas wells and 80 dry holes. Of the dry holes, 46 were in proven fields. Of these 46 dry holes, 13 were in the Artesia-Grayburg-Jackson-Maljamar area, Eddy County, two in the Getty Extension field, Eddy County, 11 in the Red Mountain field, McKinley County, three in the Rattlesnake field, San Juan County, and nine in the Aztec-Bloomfield area, San Juan County. There were only eight dry holes in the proven fields in Lea County.

SOUTHEASTERN NEW MEXICO

Lea County.—The Monument field was the largest producing field in Lea County, with 10,945,788 bbl., closely followed by the Eunice field with 10,927,929 bbl. The Hobbs field, formerly the largest producing field in Lea County, was relegated to third place, with 7,292,522 barrels. Drilling during the year closed the gap between the northern part of the Eunice field and the southern part of the

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[1] President, New Mexico School of Mines, and Director, State Bureau of Mines and Mineral Resources, Socorro, N. M.

[2] Acting State Geologist and member New Mexico Oil Conservation Commission.

Manuscript received at the office of the Institute March 11, 1938.

Monument field. The wells in this area were relatively small, because of decreased porosity in the lime,

The greatest activity in Lea County was in the Monument pool, with 199 completions, 197 being oil wells, one a gas well and one a dry hole. The limits of this pool were not defined on the west, northwest or north. The total number of 40-acre oil-producing units in the field at the close of the year was 460.

Drilling during the year developed an important pool in the Vacuum area. The first well drilled in this area was the Texas Inglefield-Bridges State No. 1 in sec. 4, T. 17 S., R. 34 E. An estimated potential production of 100 bbl. a day was obtained. The well was drilled to a total depth of 5,329 ft., and plugged and abandoned May 15, 1928.

The second well drilled in the area was the Magnolia State Bridges A–1 on the section line between secs. 13 and 14, T. 17 S., R. 34 E. The hole was temporarily abandoned at 4,900 ft. in July, 1929. It was estimated at that time that the well would produce 100 bbl. daily.

In November 1936, the Magnolia Petroleum Co. spudded its State G–1 in the NW¼ NW¼ NE¼ sec. 24, T. 17 S., R. 34 E., approximately ¾ mile southeast of its State Bridges A–1 well, and completed it in February 1937 as a 150-bbl. pumping well

TABLE 1.—*Oil and Gas production in New Mexico*

Line Number	Field, County	Age, Years to End of 1937	Area Proved, Acres				Total Oil Production, Bbl.				Total Gas Production, Millions Cu. Ft.				Number of Oil and/or Gas Wells			Number of Oil and/or Gas Wells					Depth, Average In Feet	
																During 1937		At End of 1937						
			Oil	Oil and Gas [a]	Gas	Total	To End of 1937	During 1936	During 1937	Daily Average during Nov. 1937	To End of 1937	During 1936	During 1937	Maximum Daily during 1937	Completed to End of 1937	Completed	Abandoned	Temporarily Shut Down	Producing Oil Only	Producing Oil and Gas [b]	Producing Gas Only	Total Producing	Bottoms of Productive Wells	To Top of Productive Zone
1	Arestia, Eddy	14	11,940	y	2,840	14,780	9,269,714	1,071,806	2,004,303	7,269	750x	x	x	x	423	47	x	y	207y	65y	4	276	2,251	------
2	Aztec, San Juan	13	90	0	5	95	30,129y	2,113	3,860y	------	0	0	0	0	28	0	0	8	16	0	0	16	1,075	750
3	Blanco, San Juan	10	0	40	0	40	1,226	50	70	------	166	24	35	0.2	1	0	0	0	0	0	1	1	4,550	4,250
4	Cooper, Lea	8	y	3,520	120	3,640	7,847,289	2,929,397	2,327,931	4,963	51,713	14,631	14,747	x	92	5	0	0	y	88y	4	92	3,570	------
5	Leaves, Lea	8	680	------	160	840	455,022	y	386,844	1,063	455	x	386	x	21	6	0	0	17	0	4	21	3,300	------
6	Eunice, Lea	9	y	17,640y	120	17,760	23,599,176	7,890,940	10,927,929	27,025	82,856	20,858	38,367	x	444	136	---	----	----	441	3	444	3,885	------
7	Getty, Eddy	9	240	------	-----	240	282,414	23,057	131,948	362	------	-----	------	----	9	- -	---	----	6	------	----	6	1,380	1,365
8	Hardy, Lea	2	1,520	y	0	1,520	384,795	66,575	318,220	1,198	748	148	600	1.5	38	27	0	0	38	0	0	38	3,750	------
9	Hobbs, Lea	9	1,800	8,240	0	10,040	80,533,071	9,052,129	7,292,522	16,270	174,676	14,516	15,817	y	265	7	0	0	y	262	0	262	4,174	4,050
10	Hogback, San Juan	15	160	0	0	160	1,809,025	84,657	69,875	232	0	0	0	0	7	0	0	0	7	0	0	7	714	705
11	Hospah, McKinley	10	50	0	0	50	9,000	y	2,500y	------	0	0	0	0	3	0	0	3	0	0	0	0	1,651	1,640
12	Jal, Lea	10	y	1,200y	480	1,680	5,367,365	1,104,417	435,881	1,185	16,938y	13,528	3,410	y	42	3	0	0	0	30	12	42	3,327	--
13	Kutz Canyon, San Juan	10	0	0	1,200	1,200	0	0	0	0	5,648	1,192	1,164	4.7	10	0	0	1	0	0	10	10	1,900	1,840
14	Langlie, Lea	10	y	2,120	320	2,440	796,364	y	604,846	2,410	3,439	x	2,612	x	61	45	0	0	0	53	8	61	3,583	------
15	Lynch and N. Lynch, Lea	8	520	0	0	520	6,322,864	432,871	316,625	713	0	0	0	0	18	0	0	0	13	0	0	13	3,771	------
16	Lynn, Lea	8	440	0	0	440	120,592	y	97,838	506	175	y	142	x	18	10	0	0	11	0	3	14	3,875	------
17	Mattix, Lea	1	1,920	0	120	2,040	583,876	59,510	524,366	2,064	672	68	604	x	52	36	0	0	48	0	4	52	3,545	------
18	Monument, Lea	3	y	18,520y	40	18,560	14,763,090	3,579,908	10,945,788	30,447	39,443	7,165	29,444	x	464	198	0	3	y	460y	1	461	3,940	------
19	Penrose, Lea	2	y	3,240y	0	3,240	1,637,528	205,398	831,590	3,506	1,764	349	1,415	x	81	66	0	0	y	81y	0	81	3,650	------
20	Rattlesnake, San Juan	13	640	0	0	640	3,813,064	291,404	279,845	815	0	0	0	0	49	6	7	2	25	0	0	25	808	784
21	Red Mt., McKinley	2	20	0	0	20	2,800y	1,600y	1,200y	4	0	0	0	0	6	2	1	2	3	0	0	3	457	438

22	Rhoades, Lea	10	0	120	120	240	121, 746	y	30, 172	120	7, 750	x	1, 920	x	6	2	0	0	y	3	3	6	3, 450	------
23	Skelly, Lea	2	y	1, 360y	80	1, 440	515, 911	y	423, 114y	1, 524	0. 3	x	0. 2	x	39	25	0	2	y	34	3	37	3, 666	------
24	South Eunice, Lea	8	y	1, 720y	160	1, 880	990, 373	y	579, 664	2, 314	495	x	289	0. 6	47	32	0	0	y	43	4	47	3, 855	------
25	Table Mesa, San Juan	12	100	0	0	100	451, 890	31, 131	29, 973	86	0	0	0	0	6	0	0	0	6	0	0	6	1, 337	1, 325
26	Ute Dome, San Juan	15	0	0	640	640	0	0	0	0	3, 911y	452	668	6. 5	3	0	0	0	0	0	3	3	2, 350	2, 285
27	Vacuum, Lea	9	200	0	0	200	7, 726	0	7, 726	80	x	x	x	x	5	4	0	0	5	0	0	5	4, 500	4, 300y
	Total	----	20, 320	57, 720	6, 405	84, 445	159, 106, 050	26, 827, 503	38, 484, 630	------	391, 599. 3	72, 931	111, 620. 2	----	2, 238	657	8	21	402	1, 560	67	2, 029	------	------

TABLE 1.—*Oil and Gas production in New Mexico*—Continued

Line Number	Field, County	Oil Production Methods at End of 1937				Pressure, Lb. per Sq. In.[d]			Character of Oil, Approx. Average during 1937					Character of Gas, Approx. Average during 1937		Producing Rock						Number of Dry and/or Near-dry Holes to End of 1937	Deepest Zone Tested to End of 1937		Reference to Text[j]
		Number of Wells			Injection into Reservoir	Initial	Average at End of		Gravity A. P. I. at 60° F.			Sulphur, Per Cent	Base[e]	B. t. u. per Cu. Ft.	Gal. Gasoline per M Cu. Ft.	Name	Age[f]	Character[g]	Porosity[h]	Net Thickness, Average in Feet	Structure[i]		Name	Depth of Hole, Ft.	
		Flowing	Pumping	Gas-lift			1936	1937	Minimum	Minimum	Weighted Average														
1	Artesia, Eddy	65	207	--	0	x	x	x	39.6	35	37.1	0.87	M	y	y	Upper San Andres.	Per	D	--	x	AM	121	Permian	4,412	--
2	Aztec, San Juan	0	16	0	0	e0	e0	e0	58	50	55	0.08	P	1,153	x	Farmington sand.	CreU	S	--	25	S	47	Lewis Sh, CreU	2,665	A
3	Blanco, San Juan.	0	0	0	0	e1,200	e1,120	e1,100	55	50	54	0.13	P	1,050	y	Pictured Cliffs	CreU	S	--	x	H	18	Mesa Verde, CreU.	4,550	A
4	Cooper, Lea	56	13	19	0	x	e1,300y	e1,250y	--	--	29	x	P	x	x	White lime	Per	D	Cav	--	A	4	L. San Andres Per.	5,095	A
5	Eaves, Lea	13	4	0	0	x	x	e1,247	--	--	28.5	1.90	P	x	y	Permian sand	Per	S	--	--	A	2	San Andres Per	3,542	--
6	Eunice, Lea	425	10	6	0	x	e1,332	e1,250y	--	--	28.5	1.97	P	y	y	White lime	Per	D	Cav	--	A	6	San Andres Per	4,404	A
7	Getty, Eddy	--	6	--	--	--	--	--	y	y	22y	x	A	--	--	Capitan	Per	LS	--	20	A	3	Pennsylvanian?	6,630	--
8	Hardy, Lea	32	6	0	0	x	x	x	--	--	33	1.80	P		y	Permian sandstone and White lime.	Per	S–D	Cav	--	A	0	San Andres Per	3,815	A
9	Hobbs, Lea	249	11	2	--	e1,550	e1,228	e1,201	35.5	35	35.3	1.47	M	1,150	1.98	White lime	Per	D	Cav	123	A	11	San Andres Per	4,500	A
10	Hogback, San Juan.	7	0	0	0	e215	e155	e150	60	60	60	0.08	P	0	0	Dakota sand	CreU	S	--	9	D	9	McElmo-CreL	1,225	A
11	Hospah, McKinley.	0	0	0	0	x	x	x	30.2	29	29.7	0.15	M	--	--	Hospah sand	CreU	S	--	11	DF	12	Dakota Ss-CreU	3,282	A
12	Jal, Lea	16	10	4	0	y	y	y	--	--	28.5	1.97	P	y	y	White lime	Per	D	Cav	--	A	2	San Andres Per	4,125	A
13	Kutz Canyon, San Juan.	0	0	0	0	e565	e500	e480	0	0	0	0	--	1,050	0.2y	Pictured Cliffs	CreU	S	--	60	H	12	Mesa Verde CreU.	4,400	A
14	Langlie, Lea	49	1	3	0	x	x	e1,089	y	y	28	1.90	P	y	y	Permian sand	Per	S	--	--	A	4	San Andres Per	3,903	--
15	Lynch and N. Lynch, Lea.	0	13	0	0	x	x	x	y	y	27	1.53	P	--	--	White lime	Per	D	Cav	--	AM	16	San Andres Per	4,046	--
16	Lynn, Lea	8	0	3	0	x	x	x	y	y	29	y	P	y	y	Permian sandstone and White lime.	Per	D	Cav	--	A	2	San Andres Per	5,095	--

17	Mattis, Lea	43	5	0	0	*x*	*x*	e1,200	*y*	*y*	29	*y*	P	*y*	*y*	Permian sand	Per.	S			A	2	San Andres Per.	3,853	
18	Monument, Lea.	450	7	3	0	e1,427	e1,409	1,353	*y*	*y*	34	*y*	P	*y*	*y*	White lime	Per.	D	Cav.		A	5	San Andres Per.	4,534	
19	Penrose, Lea	74	7	0	0	*x*	*x*	e1,000	*y*	*y*	34	*y*	P	*y*	*y*	Permian sand	Per.	S			A	2	San Andres Per.	4,073	
20	Rattlesnake, San Juan.	0	25	0	2	*y*	*y*	*y*	87	60	60	0.05	P	0	0	Dakota sand	CreU.	S		24	AF	19	PennU	7,370	A
21	Red Mt., McKinley.	0	3	0	0	e0	e0	e0	43	41	42	0.01	M	0	0	Mesa Verde	CreU.	S		13	AF	19	Mesa Verde CreU.	640	A
22	Rhoades, Lea	3	0	0	0	*x*	*x*	e1,278	*y*	*y*	*y*	*y*	P	*y*	*y*	Permian sand	Per.	S			A	3	San Andres Per.	4,115	
23	Skelly, Lea	27	7	0	0	*x*	*x*	*x*	*y*	*y*	34	*y*	P	*y*	*y*	Permian sand	Per.	S			A	3	San Andres Per.	4,052	
24	South Eunice, Lea.	41	2	0	0	*x*	*x*	e1,355	36	32	34	*y*	P	*y*	*y*	White lime	Per.	D	Cav.		A	1	San Andres Per.	6,202	
25	Table Mesa, San Juan.	0	6	0	0	e0	e0	e0	57	56	56.5	0.04	P	0	0	Dakota sand	CreU.	S		7	A	7	Chinlee-TriasU	3,010	A
26	Ute Dome, San Juan.	0	0	0	0	e720	e550	e525	0	0	0	0		1,060	0.2*y*	Dakota sand	CreU.	S		60	D	0	Dakota Ss-CreU	2,350	A
27	Vacuum, Lea	5	0	0	0	e1,510	*x*	e1,510	39	32	35	*y*	P	*y*	*y*	White lime	Per.	D	Cav.	200*y*	A	5	San Andres Per.	5,329	
	Total	1,563	359	40	2																	335			

After the completion of the Magnolia State G–1 the Texas Co. spudded in its State L–1 in the SW¼ NE¼ sec. 1, T. 18 S., R. 34 E., in September 1937, and completed it in November 1937 at a depth of 4,497 ft. The initial production was 820 bbl. of oil at 34.4° Bé. gravity with a gas-oil ratio of 1360. This well definitely proved that a large oil field had been discovered.

It is anticipated that the Vacuum area will have the greatest activity of any of the New Mexico fields during 1938. The State of New Mexico owns most of the acreage in the probable producing areas.

Eddy County.—Two new fields were discovered during the year in New Mexico, one in the Black River dome area, Eddy County, and the other about 2½ miles east of the Getty field, Eddy County.

The discovery well at the Black River dome, the Collins Weiler No. 1 in sec. 13, T. 24 S., R. 26 E., was drilled to a depth of 2,918 ft. and was considered a small producer. An offset to this well also encountered oil, but it was not a completion at the end of the year. This may prove to be the first commercial field discovered west of the Pecos River.

The Barber field was discovered in February. In that month the Neil Wills Colgalzier No. 1 in sec. 20, T. 30 S., R. 30 E., was completed at 1,443 ft. Its initial production was 132 bbl. oil on swab, the gravity being 20.5 Bé. Four oil wells with an average initial production of about 200 bbl. were drilled in the area, during the year, and also two dry holes.

At the close of the year the Shugart Coulthard No. 1 well in sec. 35, T. 18 S., R. 31 E., was swabbing and flowing around 60 bbl. of oil daily at a depth of 3,727 ft., but was not a completion. This well is approximately 9 miles south of the Skelly section of the Artesia-Grayburg-Jackson-Maljamar area.

In the early part of 1937 a 5½-in. oil line was constructed from the Artesia-Grayburg-Jackson-Maljamar area to connect with the line of the Texas Pipe Line Co. at Lea. This line approximately doubled the market outlet for the Eddy County fields.

NORTHWESTERN NEW MEXICO

In San Juan County most of the drilling was confined to the Rattlesnake field, with the completion of six oil wells, three dry holes, and the abandonment of seven old wells in the field.

In McKinley County the small Red Mountain field proved to be a disappointment. Two small producing oil wells and eleven dry holes were drilled in this area during the year. At the end of the year there were six producing wells in the area, and the estimated production for 1937 was 1,200 bbl. Production is obtained in the Mesa Verde formation, Upper Cretaceous, at a depth of approximately 440 feet.

NORTHEASTERN NEW MEXICO

In the northeastern part of the State the greatest activity was in the Bueyeros field, Harding County, with the drilling of five carbon dioxide gas wells. Four of them were completed in the upper gas horizon at depths of less than 1,000 ft., and one well was completed in the lower horizon at a total depth of 2,041 feet.

The initial daily production of the wells completed in the upper horizon is 2,000,000 to 3,000,000 cu. ft. with a pressure of approximately 400 lb. The initial production of the deep well located in sec. 31, T. 20 N., R. 31 E., was estimated to be 20,000,000 to 30,000,000 cu. ft. of gas containing approximately 99 percent of carbon dioxide. The pressure was estimated to be about 600 pounds.

During the year two small experimental dry-ice plants were completed in the Bueyeros field, but production was negligible.

ACKNOWLEDGMENTS

The authors are indebted to Mr. John A. Frost, District Engineer, United States Geological Survey, Farmington, New Mexico, for information on the northwestern area, comprising San Juan and McKinley Counties. For information on the southeastern area, consisting of Eddy and Lea Counties, they are indebted to Mr. C. G. Staley, Proration Umpire for Lea and Eddy Counties, and his assistant, Mr. John Kelly. For general information and compilation of various data the assistance of Mr. T. P. Wootton, of the staff of the State Bureau of Mines and Mineral Resources, Socorro, is acknowledged.

TABLE 2.—*Summary of Drilling Operations in New Mexico, 1937*

SURFACE FORMATION, TERTIARY; DEEPEST HORIZON TESTED, PERMIAN

IMPORTANT WILDCATS DRILLED IN 1937

	County or Local Division	Location			Total Depth, Feet or Meters	Drilled by	Initial Production per Day		Remarks
		Sec.	Twp.	Rge.			Oil, U. S. Bbl.	Gas, Millions Cu. Ft.	
1	Lea	31	17 S	37 E	5,300	Ajax Drill Co.			Abandoned.
2	Lea	5	20 S	38 E	4,410	Baldridge			Abandoned.
3	Lea	8	21 S	38 E	4,401	Brown et al			Abandoned.
4	Lea	22	21 S	34 E	4,144	Brown et al			Abandoned.
5	Lea	7	16 S	36 E	5,512	Carlock			Abandoned.
6	Lea	35	20 S	38 E	4,842	Continental			Abandoned.
7	Lea	30	20 S	38 E	3,860	Continental	1,248	*y*	NE. extension of Eunice.
8	Lea	2	11 S	36 E	5,277	Crandall & Osmond.			Abandoned.
9	Lea	2	21 S	32 E	3,500	Culberson & Irwin.			Abandoned.
10	Lea	12	26 S	32 E	4,868	Homestead O. & G.			Abandoned.
11	Lea	9	22 S	34 E	4,125	Humble O. & G.			Abandoned.
12	Lea	6	20 S	38 E	4,244	Leonard, Harry			Abandoned.
13	Lea	7	26 S	38 E	4,030	Magnolia Petr. Co.			Abandoned.
14	Lea	32	10 S	34 E	4,819	Maxwell, J. T.			Abandoned.
15	Lea	2	11 S	36 E	5,162	Maxwell & Crandall.			Abandoned.
16	Lea	30	17 S	34 E	4,952	Phillips Petr.			Abandoned.
17	Lea	30	20 S	39 E	4,711	Rushwold			Abandoned.
18	Lea	34	20 S	35 E	4,195	Shell Oil			Abandoned.
19	Lea	1	18 S	34 E	4,497	Texas Co.	600	3	3½ miles south of Vacuum discovery well.
20	Eddy	13	24 S	26 E	2,918	Collins, T. D.	Small well		Black River Dome area.
21	Eddy	35	18 S	31 E	3,727	Shugart	Not completed.		Swabbing and flowing 60 bbl. oil.
22	Eddy	20	30 S	30 E	1,443	Wills, Neil	132		On swab.

	In Proven Fields	Wildcats
Number of wells drilling Dec. 31, 1937	83	32
Number of oil wells completed during 1937	640	3
Number of gas wells completed during 1937	19	0
Number of dry holes completed during 1937	46	34

FOOTNOTES TO COLUMN HEADINGS—TABLE 1

[a] In areas where both oil and gas are produced, unless gas is marketed outside the field, such areas are included in column headed "Oil." Manufacture of casinghead gasoline and carbon black is interpreted as outside marketing of gas.

[b] Wells producing both oil and gas are classified as "Producing Oil Only" unless gas from them is marketed off the lease.

[c] W, water; G, gas; A, air; AG, air-gas mixture. Numbers following letters indicate numbers of injection wells.

[d] Bottom-hole pressures are preceded by "e." All other figures represent pressures at casinghead with well closed.

[e] P, paraffin; A, asphalt; M, mixed.

[f] Cam, Cambrian; Ord, Ordovician; Sil, Silurian; Dev, Devonian; Mis, Mississippian; MisL, Lower Mississippian; MisU, Upper Mississippian; Pen, Pennsylvanian; Per, Permian; Tri, Triassic; Jur, Jurassic; CreL, Lower Cretaceous; CreU, Upper Cretaceous; Eoc, Eocene; Olig, Oligocene; Mio, Miocene; Pli, Pliocene.

[g] S, sandstone; SH, sandstone, shaly; Ss, soft sand; H, shale; L, limestone; LS, limestone, sandy, C, chalk; A, anhydrite; D, dolomite; Da, arkosic dolomite; GW, granite wash; P, serpentine; O, oolite; Slt, siltstone.

[h] Figures are entered only for fields where the reservoir rock is of pore type. Figures represent ratio of pore space to total volume of net reservoir rock expressed in percent. "Por" indicates that the reservoir rock is of pore type but said ratio is not known by the author. "Cav" indicates that the reservoir rock is of cavernous type; "Fis," fissure type.

[i] A, anticline; AF, anticline with faulting as important feature; Af, anticline with faulting as minor feature; AM, accumulation due to both anticlinal and monoclinal structure; H, strata are horizontal or near horizontal; MF, monocline-fault; MU, monocline-unconformity; ML, monocline lens; MC, monocline with accumulation due to change in character of stratum; MI, monocline with accumulation against igneous barrier; MUP, monocline with accumulation due to sealing at outcrop by asphalt; D, dome; Ds, saltdome T, terrace; TF, terrace with faulting as important feature; N, nose; S, syncline.

[j] Information will be found in test as indicated by symbols; A, name of author, other than above, who has compiled the data on the particular field; C, chemical treatment of wells; G, gas-oil ratios; P, proration; U, unit operation; R, references; W, water; O, other information.

INTERPRETATIONS*

Generally in Table 1 the unit for presentation of data is a field. For our purposes a field is defined as the whole of a surface area wherein productive locations are continuous. Such unit commonly includes and surrounds nonproductive areas. Such unit commonly includes a great variety of geologic conditions—several units of continuous productive reservoirs of distinctly different structure and of distinctly different stratigraphy. Therefore it is hoped that our authors will subdivide "field" so as to enable students to make analyses that may have scientific and/or commercial value.

As to each space in the tabulation, it is either (1) not applicable, (2) the proper entry is not determinable, (3) the proper entry is determinable, but not determinable from data available to the author, (4) the proper entry is determinable by the author. In spaces not applicable, the author will please draw horizontal lines; in spaces where the proper entries are not determinable, the author will please insert *x*; in spaces where the proper entries are determinable but not determinable from data available to the author, the author will please insert *y*; in spaces where the proper entries are determinable by the author he will, of course, make such entries. Generally, *y* implies a hope that in some future year a definite figure will be available.

Inability to determine precisely the correct entry for a particular space should not lead the author to insert merely *y*. Contributions of great value may be made by the author in many cases where entries are not subject to precise determination. In such cases the author should use his good judgment and make the best entry possible under the circumstances. For many spaces, the correct entries represent the opinion of the author (for example, "Area Proved") and in such cases the entries need not be hedged to such extent as in cases where the quantities are definite yet can be ascertained only approximately by the author.

In cases under definite headings but where figures are only approximate, the author may use *x*. For example, if the total production of a field is known to be between 1,800,000 and 1,850,000, the author may report 1,8*xx*,*xxx*; or if the production is between 1,850,000 and 1,900,000, the author may report 1,9*xx*,*xxx*.

Where a numeral is immediately to the left of *x* or *y*, such numeral represents the nearest known number in that position.

As to quantity of gas produced from many fields the question will arise as to whether the figures should include merely the gas marketed or should include also estimates of gas used in operations and gas wasted. Although rough approximations may be involved, our figures should represent as nearly as possible the total quantity of gas removed from the reservoir.

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*Quoted from Circular to Authors by Frank A. Herald, Consulting Petroleum Geologist and Engineer; Vice Chairman for Production, A. I. M. E. Petroleum Division, 1933 and 1934.

While we have not provided a column for showing the thickness of the productive zone, generally the difference between average depth to bottoms of productive wells and average depth to top of productive zone will represent approximately the average thickness of the productive zone. For fields where this is not true because of unusually high dips, or for other reasons, it is suggested that the authors indicate in their texts the approximate average thickness of the productive zone.

The figure representing net thickness of producing rock should correspond to the total of the net portions of the producing zone which actually yield oil into the drill hole. It is recognized that for some fields the authors can make only rough guesses—so rough that figures would be of no value. In such cases the authors should enter either *x* or *y*, whichever is more appropriate.

We are particularly anxious to have every author give due consideration to the determination of structural conditions of each oil and/or gas body. Please consider each oil and/or gas reservoir and indicate its structure. The mere fact that a reservoir is on an anticline is not proof that the structural condition affecting the accumulation is anticlinal; for example, an oil and/or gas body limited by the upper margin of a lens on the limb of an anticline is "ML" as to structure. By all means, if the oil body occupies any position in the lens other than its upper limit, please so indicate clearly by footnote, for "ML" means, unless modified, that the accumulation is at the upper part of the lens. In every case where the oil and/or gas body terminates short of the up-dip continuity of the reservoir, please carefully check your evidence and then appropriately record your conclusion. "Terrace," "Nose," and "Syncline" are the only terms in our legend which presume such continuity.

Please note that the heading "Number of Dry and/or Near-dry Holes" is intended to cover only such holes as are within the limits of the defined fields.

In Table 2 are listed the important wildcat wells completed during the year. By the term "important" is meant: wells discovering new fields; wells resulting in the discovery of important extensions to old fields; wells discovering new zones in old fields; wells condemning important areas or resulting in significant stratigraphic information, even if the wells are dry; and exceptionally deep wells. At the foot of this table the total number of wells drilled in each district is given, segregaged as to oil wells, gas wells, and dry holes. The number of wells drilling on Dec. 31, 1937, are in two divisions, designated as wildcat wells and wells in proven fields.

OIL AND GAS DEVELOPMENT IN NEW MEXICO IN 1938

By A. Andreas*

New Mexico retained its position in 1938 as the sixth largest oil-producing state, with a total production of 35,510,176 bbl. This was 2,875,598 bbl. less than the 1937 production of 38,485,774 bbl., or a decrease of 0.077 percent, which was caused by the lack of pipe-line facilities and storage at the pipe-line terminals.

The production for Lea County (excluding Maljamar) was 32,926,788 bbl.; for Eddy County (including Maljamar) was 2,225,411 bbl.; and for northwestern New Mexico (San Juan and McKinley Counties), 357,977 bbl. The average daily nonmarginal well allowable for Lea County on Jan. 1, 1938, was 65 bbl. At the close of the year it was 49 bbl. The average daily pipe-line runs for domestic consumption were less than the state allowables recommended by the United States Bureau of Mines. There was a demand for Artesia crude for foreign export, which if included in the daily production for New Mexico would be slightly in excess of the daily production recommended for New Mexico by the Bureau of Mines. The daily average production for the year was 97,329 barrels.

There were 622 completions in the state, of which 520 were oil wells; 16 hydrocarbon gas wells; 5 carbon dioxide gas wells, and 81 dry holes. Of the dry holes 38 were in or nearby proven fields and the remainder, 43, were wildcats.

Five new fields were discovered in New Mexico during 1938, three in Lea County and two in Eddy County.

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* State Geologist, member of New Mexico Oil Conservation Commission, Santa Fe, New Mexico.

SOUTHEASTERN NEW MEXICO

Lea County.—The Monument field was the largest producing field in Lea County, with 9,440,334 bbl., and was closely followed by the Eunice field with 8,872,335 bbl. The Hobbs field was third with 5,010,414 bbl. The greatest activity in Lea County was in the Vacuum pool, with 129 completion, of which 126 were oil wells and three were dry holes.

The Texas Company completed its Corbin No. 1 in the NW¼SW¼ sec. 10, T. 18 S., R. 33 E. in August. This well was drilled to a depth of 5118 ft. in a white sand, encountering salt water. It was plugged back to 4,315 ft. and pumped 43 bbl. of 36° gravity oil in 12 hr. It was approximately 6 miles southwest of the closest production in the Vacuum pool and undoubtedly is a separate structure or producing area. The well has not produced any oil because of the lack of pipe-line facilities.

Manuscript received at the office of the Institute Feb. 21, 1939.

TABLE 1.—*Oil and Gas Production in New Mexico in 1938*

Line Number	Field, *County*	Age, Years to End of 1938	Area Proved, Acres		Total Oil Production, Bbl.		Total Gas Production, Millions Cu. Ft.		Number of Oil and /or Gas Wells					Oil-production Methods at End of 1938	
										During 1938		At End of 1938		Number of Wells	
			Oil	Gas[a]	To End of 1938	During 1938	To End of 1938	During 1938	Completed to End of 1938	Completed	Abandoned	Producing Oil[b]	Producing Gas[c]	Flowing	Artificial Lift
1	Artesia, *Eddy*	15	14,540*y*	2,960	11,405,116	2,135,402	*x*	*x*	490	75	*y*	323*y*	15*y*	75*y*	248*y*
2	Aztec, *San Juan*	14	90	5	33,729	3,600	0	0	29	1	1	16	0	0	16
3	Barber, *Eddy*	2	320	0	27,889	27,889	0	0	8	4	1	5	0	0	5
4	Black River, *Eddy*	1	80	0	2,872	2,728	0	0	2	1	1	1	0	0	1
5	Blanco, *San Juan*	11	0	40	1,286	60	195	29	1	0	1	0	1		
6	Comanche, *Chaves*	2	20	0	1,000*y*	*y*	0	0	1	0	0	1	0	0	1
7	Cooper, *Lea*	9	3,880*y*	160	9,529,467	1,682,178	74,470	22,757	101	9	*y*	95	2	52	[1]43
8	Eaves, *Lea*	9	720*y*	160	786,849	331,827	5,338*y*	4,883	22	1	*y*	19	1	8	[2]11
9	Eunice, *Lea*	10	19,360*y*	160	32,471,511	8,872,335	127,576	44,720	488	45	*y*	483	0	447	[3]36
10	Getty, *Eddy*	10	240	0	341,806	59,392	0	0	9	0	*y*	4	0	0	4
11	Hardy, *Lea*	3	3,080*y*	0	1,005,063	620,268	4,623	3,875	79	39	*y*	75	0	67	8
12	Hobbs, *Lea*	10	10,080	0	85,543,485	5,010,414	186,114	11,438	266	1	*y*	252*y*	0	237	[4]15
13	Hogback, *San Juan*	16	160	0	1,882,256	73,231	0	0	7	0	0	7	0	7	0
14	Hospah, *McKinley*	11	120	0	10,000	1,000	0	0	5	2	0	0	0	0	0
15	Jal, *Lea*	11	1,360*y*	480	5,729,040	361,675	25,883*y*	8,945	46	0	*y*	28*y*	12	16	[5]12
16	Kutz Canyon, *San Juan*	11	0	1,200	0	0	7,063	1,415	12	2	0	0	12		
17	Langlie, *Lea*	11	3,760*y*	320	2,015,370	1,219,006	14,171	10,732	106	46	0	98	8	96	[6]2
18	Lynch & N. Lynch, *Lea*	9	520	0	6,549,924	227,060	139*y*	139	18	0	*y*	13	0	0	13
19	Lynn, *Lea*	9	1,000*y*	120	405,891	285,299	1,647	1,472	28	10	*y*	20*y*	3	16	[7]4
20	Mattix, *Lea*	2	3,360*y*	240	1,520,871	936,995	4,979	4,307	89	39	*y*	77	5	74	3
21	Monument, *Lea*	4	19,280*y*	40	24,203,434	9,440,344	68,216	28,773	482	18	*y*	478*y*	0	468	10
22	Penrose, *Lea*	3	5,320*y*	0	2,549,930	1,512,402	9,756	7,992	133	51	0	133	0	115	[8]18
23	Rattlesnake, *San Juan*	14	640	0	4,065,418	252,354	0	0	62	13	12	38	0	0	38
24	Red Mountain, *McKinley*	3	20	0	3,700*y*	900*y*	0	0	7	1	0	2	0	0	2
25	Rhodes, *Lea*	11	240*y*	240	160,748	39,002	15,148*y*	7,398	23	6	0	6	17	5	1
26	Skelly, *Lea*	3	2,080*y*	120	1,039,439	523,528	2,100.3	2,100	52	13	*y*	45*y*	1	30	15
27	South Eunice, *Lea*	9	2,680*y*	200	2,002,551	1,012,178	5,384*y*	4,889	71	25	*y*	67*y*	0	66	1
28	South Lovington, *Lea*	1	0	40	0	0	*y*	*y*	1	1	0	0	1		
29	Table Mesa, *San Juan*	13	100	0	478,722	26,832	0	0	6	0	0	6	0	0	6
30	Ute Dome, *San Juan*	16	0	640	0	0	4,664	753	3	0	0	0	3		
31	Vacuum, *Lea*	10	5,240	0	858,429	850,703	936*y*	936	131	126	0	129	0	122	[9]7
32	West Eunice, *Lea*	10	120	0	18,074*y*	1,574	0	0	3	2	0	2	0	0	2
33	Total		98,450*y*	7,085	194,643,870	35,510,176	558,402.3	167,553	2,780	531		2,423	81	1,901	524

See footnotes at end of table.

TABLE 1.—*Oil and Gas Production in New Mexico in 1938*—Continued

Line Number	Field, *County*	Pressure Lb. per Sq. In.[d]			Character of Oil, Approx. Average during 1938	Producing Formation								Deepest Zone Tested to End of 1938		Reference to Text[i]
		Initial	Average at End of		Gravity A. P. I. at 60° F.	Name	Age[e]	Depth, Average in Feet		Character[f]	Porosity[g]	Net Thickness, Average in Feet	Structure[h]	Name	Depth of Hole, Ft.	
			1937*	1938	Weighted Average			Bottoms of Productive Wells	To Top of Productive Zone							
1	Artesia, *Eddy*	*x*	*x*	*x*	37.1	Upper San Andres	Per	3,693		D		*x*	Am	Permian	4,412	
2	Aztec, *San Juan*	*x*	*x*	*x*	55	Farmington sand	Cre U	1,075	750	S		25	S	Lewis share Cre U	2,665	A
3	Barber, *Eddy*	*x*	*x*	*x*	20.5	Capitan	Per	1,466	1,459	L		7	A	Capitan Per	1,953	
4	Black River, *Eddy*	0	0	.0	39	Delaware sand	Per	2,545		S			MF	Delaware	2,885	
5	Blanco, *San Juan*	*e*1,200	*e*1,000	*e*1,050	54	Pictured Cliffs	Cre U	4,550	4,250	S		*x*	H	Mesa Verde Cre U	4,550	A
6	Comanche, *Chaves*	0	0	0	*y*	Capitan	Per	1,283		S			ML	Capitan Per	1,400	
7	Cooper, *Lea*	*x*	*e*1,250*y*	*y*	29	White Lime	Per	3,608	3,542	D	Cav	*x*	A	L. San Andres Per	5,095	
8	Eaves, *Lea*	*x*	*e*1,247	*y*	28.5	Permian sand	Per	3,360	3,175	S			A	San Andres Per	3,542	
9	Eunice, *Lea*	*x*	*e*1,250*y*	*y*	34.0	White Lime	Per	3,883	3,860	D	Cav		A	San Andres Per	4,404	
10	Getty, *Eddy*	0	0	0	22*y*	Capitan	Per	1,380	1,365	L		15	A	Pennsylvanian?	6,683	
11	Hardy, *Lea*	*x*	*x*	*x*	33	Permian sand and White Lime.	Per	3,763	3,710	S-D	Cav		A	San Andres Per	3,821	
12	Hobbs, *Lea*	*e*1,550	*e*1,201	*y*	35.3	White Lime	Per	4,174	4,050	D	Cav	123	A	San Andres Per	4,500	
13	Hogback, *San Juan*	*e*215	*e*150	*y*	60	Dakota sand	Cre U	714	705	S		9	D	McElmo Cre L	1,225	A
14	Hospah, *McKinley*	*x*	*x*	*x*	29.7	Hospah sand	Cre U	1,651	1,640	S		11	DF	Dakota Cre U	3,282	A
15	Jal, *Lea*	*y*	*y*	*y*	36.0	White Lime	Per	3,334	3,303	D	Cav		A	San Andres Per	4,125	
16	Kutz Canyon, *San Juan*	*e*565	*e*480	*e*460		Pictured Cliffs	Cre U	1,900	1,840	S		60	H	Mesa Verde Cre U	4,400	A
17	Langlie, *Lea*	*x*	*e*1,089	*y*	28	Permian sand	Per	3,530	3,350	S			A	San Andres Per	3,903	
18	Lynch & N. Lynch, *Lea*	*x*	0	0	27	White Lime	Per	3,777	3,760	D	Cav		AM	San Andres Per	4,046	
19	Lynn, *Lea*	*x*	*x*	*y*	33	Permian sand and White Lime.	Per	3,797	3,550	D	Cav		A	San Andres Per	5,095	

20	Mattix, *Lea*	*x*	*e*1, 200	*y*	29	Permian sand	Per	3, 559	3, 500	S			A	San Andres Per	4, 200	---
21	Monument, *Lea*	*e*1, 427	*e*1, 353	*y*	34	White Lime	Per	3. 939	3, 829	D	Cav		A	San Andres Per	4. 534	---
22	Penrose, *Lea*	*x*	*e*1, 000	*y*	36. 5	Permian sand	Per	3, 667	3, 550	S			A	San Andres Per	4. 705	---
23	Rattlesnake, *San Juan*	*x*	*x*	*x*	60	Dakota sand	Cre U	808	784	S			A	Pen U	7, 370	A
24	Red Mountain, *McKinley*	0	0	0	42	Mesa Verde	Cre U	457	438	S		24	AF	Mesa Verde Cre U	640	A
25	Rhodes, *Lea*	*x*	*e*1, 278	*y*	38. 8	Permian sand	Per	3. 375	3. 050	S		13	AF	San Andres Per	4, 115	---
26	Skelly, *Lea*	*x*	*x*	*y*	34	Permian sand	Per	3, 663	3. 525	S			A	San Andres Per	4, 052	---
27	South Eunice, *Lea*	*x*	*e*1, 355	*y*	34	White Lime	Per	3. 845	3, 775	D	Cav		A	San Andres Per	6, 202	---
28	South Lovington, *Lea*	---	---	---	---	Capitan	Per	3, 986	3, 956	S			A	San Andres Per	3, 986	---
29	Table Mesa, *San Juan*	0	0	0	56. 5	Dakota sand	Cre U	1, 337	1, 325	S		7	A	Chinlee-Triassic U	3. 010	A
30	Ute Dome, *San Juan*	*e*720	*e*525	*e*520	0	Dakota sand	Cre U	2, 350	2, 285	S		60	D	Dakota Cre U	2. 350	A
31	Vacuum, *Lea*	*e*1, 510	*e*1, 510	*e*1, 506*y*	35	White Lime	Per	4, 688	4. 418	D	Cav	200*y*	A	San Andres Per	5, 329	---
32	West Unnice, *Lea*	*y*	---	*y*	34. 5	White Lime	Per	3, 835	3. 768	D	Cav		A	San Andres Per	4, 695	---

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[1] 22 pumping, 21 gas lift.
[2] 1 pumping, 10 gas lift.
[3] 12 pumping, 24 gas lift.
[4] 10 pumping, 5 gas lift.
[5] 8 pumping, 4 gas lift.
[6] 1 pumping, 1 gas lift.
[7] 3 pumping, 1 gas lift.
[8] 11 pumping, 7 gas lift.
[9] 6 pumping, 1 gas lift.

The Westmount Oil Co. completed its State No. 1 in December as a gas well in the NW¼ NE¼ sec. 12, T. 17 S., R. 36 E. Because of the lack of time and the closeness of the expiration date of the lease, which had to be validated by a commercial well, it was completed as a gas well at a depth of 3,986 ft. The initial production was approximately 4½ million cubic feet. This gas well is approximately 7 miles northeast of the closest production in the Vacuum pool and undoubtedly is a new producing area.

The Wilson-State No. 1 in NE¼ sec. 7, T. 21 S., R. 35 E. was completed Oct. 10, 1938, estimated to be a 500-bbl. well. The total depth was 3,813 ft., with the top of the pay horizon encountered at 3,788 ft. The producing horizon is the San Andres formation of the Permian. This well was drilled approximately 1½ miles northeast from the Empire-State-B No. 1 in NW¼ sec. 8, T. 21 S., R. 35 E., which was completed on July 27, 1929, at a depth of 3,836 ft., and which produced approximately 16,500 bbl. before being abandoned in 1934.

Eddy County.—Two new producing areas were discovered during the year in Eddy County; the first when the Shugart Coulthard No. 1 in sec. 35, T. 18 S., R. 31 E. was completed in May. This well was drilled to 4,088 ft. and plugged back to 3,920 ft. It was completed as a 42-bbl. pumper in the Capitan sand of Permian age. It is approximately 9 miles south of the Artesia-Grayburg-Jackson-Maljamar area. Since the completion of this discovery well, five other wells have been drilled to the same producing horizon.

TABLE 2.—*Summary of Drilling Operations in New Mexico in 1938*

SURFACE FORMATION, TERTIARY; DEEPEST HORIZON TESTED, PERMIAN

Important Wildcats Drilled in 1938

	County	Location			Total Depth, Ft.	Drilled by	Initial Production per Day	
		Sec.	Twp.	Rge.			Oil, U. S. Bbl.	Gas, Millions Cu. Ft.
1	Chaves	9	15 S	29 E	3,680	English & Harmon	(1)	
2	Chaves	1	4 S	29 E	3,686	Grastorff & Caudill	(1)	
3	Chaves	15	15 S	30 E	3,982	Interstate Minerals	(1)	
4	Curry	13	2 N	31 E	3,258	Bond & Harrison	(1)	
5	Eddy	35	18 S	31 E	4,088	Shugart et al	[2] 42	
					PB 3,920			
6	Eddy	15	25 S	28 E	3,300	W. A. Snyder	(1)	
7	Eddy	31	19 S	27 E	1,180	M. Yates, Jr.	[2] 30	
					PB 960			
8	Eddy	35	18 S	30 E	3,407	Yates & Dooley	(1)	
9	Harding	22	14 N	33 E	4,445	Rip C. Underwood	(1)	
10	Lea	31	20 S	39 E	4,355	Continental	(1)	
11	Lea	29	16 S	37 E	5,303	Continental	(1)	
12	Lea	29	26 S	38 E	3,707	Dalport Oil Corp	(1)	
13	Lea	1	20 S	38 E	4,757	Eastland Oil Co	(1)	
14	Lea	29	25 S	38 E	3,735	Leonard et al	(1)	
15	Lea	20	22 S	33 E	5,038	Mascho et al	(1)	
16	Lea	22	10 S	37 E	5,077	Rowan & Nichols	(1)	
17	Lea	33	18 S	36 E	5,289	Shell	(1)	
18	Lea	10	18 S	33 E	5,118	Texas	[2] 50	
					PB 4,319			
19	Lea	34	18 S	33 E	4,295	Texas	(1)	
20	Lea	23	12 S	36 E	5,294	Tidewater	(1)	
21	Lea	17	21 S	32 E	4,608	Todd, et al	(1)	
22	Lea	5	23 S	38 E	4,500	Weiner, et al	(1)	
23	Lea	12	17 S	36 E	3,986	Westmount Oil Co	(1)	4.46
24	Lea	7	21 S	35 E	3,813	F. C. Wilson	[2] 500	
25	Otero	34	22 S	13 E	3,945	Fred Turner, Jr	(1)	

	In Proven Fields	Wildcats
Number of wells drilling Dec. 31, 1938	129	33
Number of oil wells completed during 1938	516	4
Number of gas wells completed during 1938	15	1
Number of dry holes completed during 1938	38	43

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[1] Dry and abandoned.

[2] Pumping.

The second new producing area was discovered by the completion of the Yates-Bowers No. 1 in sec. 31, T. 19 S., R. 27 E. late in December as a 30-bbl. pumper at a depth of 1,180 ft. The producing horizon is in the Capitan formation of Permian age. The area is approximately eight miles southwest of the old Artesia field.

NORTHWESTERN NEW MEXICO

Drilling in the northwestern part of New Mexico was confined chiefly to the Rattlesnake area, San Juan County. A number of dry holes were drilled in the Farmington district. In McKinley County development was on the Hospah dome, where commercial production was encountered in August 1927 by the Midwest Oil Co. The area is now being developed by the Petroleum Products Corporation. Two commercial oil wells were drilled on this structure in 1938, with an average initial production of 200 bbl. of low-sulphur oil of 30°. The producing horizon is the Hospah sand in the Upper Cretaceous. The producing horizon in the area is encountered around 1,600 feet.

NORTHEASTERN NEW MEXICO

In the Bueyeros field, northeastern New Mexico, in Harding County, four carbon dioxide gas wells were completed. In the extreme southeastern part of the county three wells were drilled, all of which were dry holes. Two were completed at shallow depths and the third, drilled in SW¼ sec. 22, T. 14 N., R. 33 E., first encountered arkose at a depth of 2,800 ft., with sand, shale, and limestone to 3,540, where arkose was again encountered. It was reported that true granite was encountered around 4,200 ft. The total depth of this well was 4,445 feet.

ACKNOWLEDGMENTS

The author is indebted to Mr. John A. Frost, District Engineer, United States Geological Survey, Farmington, New Mexico, for information on the northwestern area. Mr. C. G. Staley, Proration Umpire for Lea and Eddy Counties, furnished the information on oil and gas production. The various operating companies, particularly the Atlantic Oil and Refining Co., cooperated in furnishing general information. Mr. T. P. Wootton, of the staff of the State Bureau of Mines and Mineral Resources, Socorro, New Mexico, cooperated in furnishing general information and checking various data compiled by the Oil Conservation Commission.

OIL AND GAS CONSERVATION LAW AND GENERAL RULES AND REGULATIONS FOR THE CONSERVATION OF OIL AND GAS IN NEW MEXICO

STATE OF NEW MEXICO, OIL CONSERVATION COMMISSION, CIRCULAR NO. 1, ISSUED BY THE OIL CONSERVATION COMMISSION, AUGUST 12, 1935, SANTA FE, NEW MEXICO, REPRINTED JUNE 1, 1939

(Oil Conservation Commission, Governor John E. Miles, Chairman; A. Andreas, Acting State Geologist; Frank Worden, Commissioner of Public Lands, Secretary)

Law Providing for the Conservation of Oil and Gas in New Mexico

SESSION LAWS OF NEW MEXICO, 1935, CHAPTER 72

AN ACT To prevent waste or crude petroleum oil, natural gas, and products thereof, as defined in this act and in furtherance thereof, creating an oil conservation commission; defining the powers and duties of such commission; authorizing it to prescribe rules, regulations, and orders; providing penalties for the violation of the provisions of this act, and of the rules, regulations, and orders of the commission; levying a tax on the proceeds of oil and gas to pay the cost of the administration and enforcement of this act; and repealing sections 97-201 to 97-204, inclusive, of the New Mexico statutes, annotated, compilation of 1929, and sections 97-601 and 97-602 of the New Mexico statutes, annotated, compilation of 1929. and sections 97-102 to 97-109, inclusive, of New Mexico statutes, annotated, compilation of 1929.

S. B. No. 79; Approved February 23, 1935

Be It Enacted by the Legislature of the State of New Mexico:

Section 1. The production or handling of crude petroleum oil or natural gas, or the handling of products thereof, in such manner or under such conditions or in such amounts as to constitute or result in waste is each hereby prohibited.

SECTION 2. As used in this act, the term "waste," in addition to its ordinary meaning, shall include:

(a) "Underground waste" as those words are generally understood in the oil business, and in any event to embrace the inefficient, excessive, or improper, use or dissipation of the reservoir energy, including gas energy and water drive, or any pool, and the locating, spacing, drilling, equipping, operating, or producing, of any well or wells in a manner to reduce or tend to reduce the total quantity of crude petroleum oil or natural gas ultimately recoverable from any pool.

(b) "Surface waste" as those words are generally understood in the oil business, and in any event to embrace the unnecessary or excessive surface loss or destruction without beneficial use, however caused, of natural gas, crude petroleum oil or any product thereof, but including the loss or destruction, without beneficial use, resulting from evaporation, seepage, leakage, or fire, especially such loss or destruction incident to or resulting from the manner of spacing, equipping, operating, or producing, well or wells, or incident to or resulting from the use of inefficient storage or from the production of crude petroleum oil in excess of the reasonable market demand.

(c) The production of crude petroleum oil in this state in excess of the reasonable market demand for such crude petroleum oil. Such excess production causes or results in waste which is prohibited by this Act. The words "reasonable market demand," as used herein, shall be construed to mean the demand for such crude petroleum oil for reasonable current requirements for current consumption and use within or outside the state, together with the demand for such amounts as are reasonably necessary for building up or maintaining reasonable storage reserves of crude petroleum oil or the products thereof, or both such crude petroleum oil and products.

SECTION 3. There is hereby created an Oil Conservation Commission, hereinafter in this Act called the "Commission," to be composed of the Governor of this State, the Commissioner of Public Lands and the State Geologist; provided that the Governor may appoint some practical oil man, a resident of this State, to serve in the place and stead of the Governor as a member of said Commission. No salary or compensation shall be paid any member of the Commission for his services as a member thereof, but the actual and necessary expenses of the members of said Commission, incurred or expended in the performance of the duties imposed on said Commission, shall be paid out of the Oil Conservation Fund hereinafter created, provided that if the State Geologist shall hold any other state office his salary may be adjusted by the Governor, and such Geologist paid part of his salary out of the Oil Conservation Fund. The term of office of each member of the commission shall be concurrent with the other office held by him, except that if the Governor shall appoint a practical oil man to serve in his place and stead, the term of office of the person so appointed shall expire with the term of the Governor by whom he shall have been appointed. The Commission shall organize by electing a chairman from its membership, and shall appoint a secretary. Two members of the Commission shall constitute a quorum for all purposes. The Commission shall adopt a seal and such seal affixed to any paper signed by the secretary of the Commission shall be prima facie evidence of the due execution thereof. The Attorney General shall be the attorney for the Commission. Any member of the Commission, or the secretary thereof, or any employee of the Commission, shall have power to administer oaths to any witness in any hearing, investigation, or proceeding contemplated by this Act or by any other law of this state relating to the conservation of oil or gas.

SECTION 4. The Commission shall have, and it is hereby given, jurisdiction and authority over all matters relating to the conservation of oil and gas in this state, and of the enforcement of all the provisions of this Act and of any other law of this state relating to the conservation of oil or gas. It shall have jurisdiction and control of and over all persons or things necessary or proper to enforce effectively the provisions of this Act or of any other law of this state relating to the conservation of oil or gas.

SECTION 5. The Commission shall prescribe its rules of order or procedure in hearing or other proceedings before it under this act. Any notice required to be given under this act or under any rule, regulation, or order prescribed by the Commission shall be by personal service on the person affected, or by publication once in a newspaper of general circulation published at Santa Fe, New Mexico, and once in a newspaper of general circulation published in the county, or one of the counties if there be more than one, in which any land, oil or gas or other property which may be affected shall be situated. Such notice shall issue in the name of "the State of New Mexico" and shall be signed by at least a majority of the members of the Commission or by the Secretary of the Commission, and the seal of the Commission shall be impressed thereon, and it shall specify the number and style of the case and the time and place of hearing, shall briefly state the general nature of the order or orders, rule or rules, or regulation or regulations contemplated by the Commission on its own motion or sought in a proceeding brought before the Commission, the name of the petitioner or applicant, and, unless the order, rule or regulation is intended to apply to and affect the entire state, it shall specify or generally describe the common source or sources of supply that may be affected by such order, rule, or regulation. Personal service thereof may be made by any agent of the Commission or by any person over the age of eighteen years, in the same manner as is provided by law for the service of summons in civil actions in the district courts of this State. Such service shall be completed at the time of such personal service or on the date of such publication, as the case may be. Proof of service shall be by the affidavit of the person making personal service, or of the publisher of the newspaper in which publication is had, as the case may be. All rules, regulations, and orders made by the Commission shall be entered in full by the secretary thereof in a book to be kept for such purpose by the Commission, which shall be a public record and open to inspection at all times during reasonable office hours. A copy of any such rule, regulation, or order, certified by the secretary of the Commission under the seal of the Commission shall be received in evidence in all courts of the State with the same effect as the original.

SECTION 6. The Commission, or any member thereof, is hereby empowered to subpoena witnesses, to require their attendance and giving of testimony before it, and to require the production of books, papers, and records, in any proceeding before the Commission. No person shall be excused from attending and testifying or from producing books, papers, and records before the Commission or from obedience to the subpoena of the said Commission, whether such subpoena be signed or issued by one or more of the members of the said Commission, in any hearing, investigation, or proceeding held by or before the said Commission or any cause of proceeding in any court by or against the said Commission, relative to matters within the jurisdiction of said Commission, on the ground or for the reason that the testimony or evidence, documentary or otherwise, required of him may tend to incriminate him or subject him to a penalty or forfeiture; provided that nothing herein contained shall be construed as requiring any person to produce any books, papers or records, or to testify in response to any inquiry, not pertinent to some question lawfully before such Commission or court for determination. No natural person shall be subjected to criminal prosecution, or to any penalty or forfeiture for or on account of any transaction, matter or thing concerning which he may be required to testify, or produce evidence, documentary or otherwise before said Commission, or in obedience to its subpoena, or in any cause or proceeding, provided, that no person testifying shall be exempted from prosecution and punishment for perjury committed in so testifying.

SECTION 7. In case of failure or refusal on the part of any person to comply with any subpoena by said Commission or any member thereof, or on the refusal of any witness to testify or answer as to any matters regarding which he may be lawfully interrogated, any district court in this State, or any judge thereof, on application of said Commission, may issue an attachment for such person and compel him to comply with such subpoena and to attend before the Commission and produce such documents, and give his testimony upon such matters as may be lawfully required, and such court or judge shall have the power to punish for contempt as in case of disobedience of a like subpoena issued by or from such court, or in refusal to testify therein.

SECTION 8. If any person of whom an oath shall be required under the provision of this act, or by any rule, regulation, or order of the Commission, shall wilfully swear falsely in regard to any matter or thing respecting which such oath is required, or shall wilfully make any false report or affidavit required or authorized by the provisions of this act, or by any rule, regulation, or order of the Commisson, such person shall be deemed guilty of perjury and shall be punished by imprisonment in the state penitentiary for not more than five years nor less than six months.

SECTION 9. The Commission is hereby empowered, and it is its duty to prevent the waste prohibited by this act. To that end, the commission is empowered to make and enforce rules and regulations and orders, and to do whatever may be reasonably necessary to carry out the purposes of this act, whether or not indicated or specified in any section hereof.

SECTION 10. Included in the power given to the Commission is the authority: to collect data; to make investigations and insepctions; to examine properties, leases, papers, books, and records; to examine, check, test, and gauge oil and gas wells, and tanks, plants, refineries, and all means and modes of transportation and equipment, to hold hearings; to provide for the keeping of records and the making of reports and for the checking of the accuracy thereof; to limit and prorate production of crude petroleum oil and natural gas; to require either generally or in particular areas certificates of clearance or tenders in connection with the transportation of crude petroleum oil or any produce thereof, or both such oil and products.

Apart from any authority, express or implied, elsewhere given to or existing in the Commission by virtue of this act or the statutes of this State, the Commission is hereby authorized to make rules, regulations, and orders for the purposes and with respect to the subject matter stated herein, viz:

(1) To require dry or abandoned wells to be plugged in such way as to confine the crude petroleum oil, natural gas, and water in the strata in which they are found, and to prevent them from escaping into other strata; The Commission may require a bond of not to exceed Ten Thousand ($10,000.00) Dollars conditioned for the performance of such regulations;

(2) To prevent crude petroleum oil, natural gas, and water from escaping from the strata in which they are found into another stratum or strata;

(3) To require reports showing locations of all oil and gas wells, and for the filing of logs and drilling records or reports;

(4) To prevent the drowning by water of any stratum or part thereof capable of producing oil or gas, or both oil and gas, by paying quantities, and to prevent the premature and irregular encroachment of water, or any other kind of water encroachment, which reduces or tends to reduce the total ultimate recovery of crude petroleum oil or gas, or both such oil and gas, from any pool;

(5) To prevent fires;

(6) To prevent "blow-outs" and "caving" in the sense that the conditions indicated by such terms are generally understood in the oil business;

(7) To require wells to be drilled, operated and produced in such manner as to prevent injury to neighboring leases or properties;

(8) To identify the ownership of oil and gas producing leases, properties, wells, tanks, refineries, pipe lines, plants, structures, and all transportation equipment and facilities;

(9) To require the operation of wells with efficient gas-oil ratios, and to fix such ratios;

(10) To fix the spacing of wells.

SECTION 11. Whenever, to prevent waste, the Commission limits the total amount of crude petroleum oil to be produced in this state, it shall allocate or distribute the allowable production among the fields of the state. Such allocation or distribution among the fields of the state shall be made on a reasonable basis, giving, if reasonable under all the circumstances, to each pool with small wells of settled production, an allowable production which will prevent a general premature abandonment of the wells in the field.

SECTION 12. Whenever, to prevent waste, the total allowable production for any field or pool in the state is fixed by the Commission in an amount less than that which the field or pool could produce if no restrictions were imposed, the Commission shall prorate or distribute the allowable production among the producers in the field or pool. Such proration or distribution shall be made on a reasonable basis. The rules, regulations, or orders of the Commission shall, so far as it is practicable to do so, afford to the owner of each property in a pool the opportunity to produce his just and equitable share of the oil and gas in the pool, being an amount, so far as can be practicably determined, and so far as such can be practicably obtained without waste, substantially in the proportion that the quantity of the recoverable oil and gas under such property bears to the total recoverable oil and gas in the pool, and for this purpose to use his just and equitable share of the reservoir energy.

No owner of a property in a pool should be required by the Commission, directly or indirectly, to drill more wells than are reasonably necessary to secure his proportionate part of the production. To avoid the drilling of unnecessary wells, a proration unit for each pool may be fixed, such being the area which may be efficiently and economically drained and developed by one well. The drilling of unnecessary wells creates fire and other hazards conducive to waste, and unnecessarily increases the cost of the products to the ultimate consumer.

The pooling of properties or parts thereof shall be permitted, and, if not agreed upon, may be required in any case when and to the extent that the smallness or shape of a separately owned tract would, under the enforcement of a uniform spacing plan or proration unit, otherwise deprive or tend to deprive the owner of such tract of the opportunity to recover his just and equitable share of the crude petroleum oil and natural gas in the pool; provided, that the owner of any tract that is smaller than the drilling until established for the field, shall not be deprived of the right to drill on and produce from such tract, if same can be done without waste; but in such case the allowable production from such tract, as compared with the allowable production therefrom if such tract were a full unit, shall be in the ratio of the area of such tract to the area of a full unit. All orders requiring such pooling shall be upon terms and conditions that are just and reasonable, and will afford to the owner of each tract in the pool the opportunity to recover or receive his just and equitable share of the oil and gas in the pool as above provided, so far as may be practicably recovered without waste. In the event such pooling is required, the costs of development and operation of the pooled unit shall be limited to the lowest actual expenditures required for such purpose including a reasonable charge for supervision; and in case of any dispute as to such costs, the Commission shall determine the proper costs.

Minimum allowable for some wells may be advisable from time to time, especially with respect to wells already drilled when this act takes effect, to the end that the production will repay reasonable lifting cost and thus prevent premature abandonment and resulting waste.

Whenever it appears that the owners in any pool have agreed upon a plan for the spacing of wells, or upon a plan or method of distribution of any allowable fixed by the Commission for the pool, or upon any other plan for the development or operation of such pool, which plan, in the judgment of the Commission, has the effect of preventing waste as prohibited by this act and is fair to the royalty owners in such pool, then such plan shall be adopted by the Commission with respect to such pool; however, the Commission, upon hearing and after notice, may sub equently modify any such plan to the extent necessary to prevent waste as prohibited by this act.

After the effective date of any rule, regulation or order fixing the allowable production, no person shall produce more than the allowable production applicable to him, his wells, leases or properties as fixed by the Commission, and the allowable production shall be produced in accordance with the applicable rules, regulations or orders.

Crude petroleum oil produced within the allowable as fixed by the Commission shall therein be referred to as "legal oil," and crude petroleum oil produced in excess of such allowable shall be "illegal oil."

SECTION 13. The sale or purchase or acquisition, or the transportation, refining, processing, or handling in any other way, of crude petroleum oil in whole or in part produced in excess of the amount allowed by any statute of this state, or by any provision of this act, or by any rule, regulation or order of the Commission made thereunder, is hereby prohibited, and such oil or commodity is hereby referred to as "illegal oil."

The sale or purchase or acquisition, or the transportation, refining, processing, or the handling in any other way, of any product of crude petroleum oil produced in whole or in part in excess of the amount allowed petroleum oil, which product is derived in whole or in part from crude by any statute of this state, or by any provision of this act, or by any rule, regulation or order of the Commission made thereunder, is hereby prohibited, and each such commodity or product is herein referred to as "illegal oil product" to distinguish it from "legal oil product."

SECTION 14. The commission is specifically authorized and directed to make such rules, regulations and orders, and may provide for such certificate of clearance or tenders, as may be necessary to make effective the prohibitions contained in Section 13.

Unless and until the Commission provides for certificates of clearance or tenders, or some other method, so that any person may have an opportunity to determine whether any contemplated transaction of sale or purchase or acquisition, or of transportation, refining, processing, or handling in any other way, involves illegal oil or illegal oil product, no penalty shall be imposed for the sale or purchase or acquisition, or the transportation, refining, processing, or handling in any other way, of illegal oil or illegal oil product, except under circumstances stated in the succeeding provisions of this paragraph. Penalties shall be imposed for the commission of each transaction prohibited in Section 13 when the person committing the same knows that illegal oil or illegal oil product is involved in such transaction, or when such person could have known or determined such fact by the exercise of reasonable diligence or from facts within his knowledge. However, regardless of lack of actual notice or knowledge, penalties as provided in this act shall apply to any sale or purchase or acquisition, and to the transportation, refining, processing, or handling in any other way, of illegal oil product where administrative provision is made for identifying the character of the commodity as to its legality. It shall likewise be a violation for which penalties shall be imposed for any person to sell or purchase or acquire, or to transport, refine, process, or handle in any other way, any crude petroleum oil or any product without complying with the rule, regulation, or order of the Commission relating thereto.

SECTION 15. Except as provided for herein, before any rule, regulation or order, including revocation, change, renewal or extension thereof, shall be made under the provisions of this act, a public hearing shall be held at such time, place and manner as may be prescribed by the Commission. The Commission shall first give reasonable notice of such hearing (in no case less than ten days, except in an emergency) and at any such hearing any person having an interest in the subject matter of the hearing shall be entitled to be heard. In case an emergency is found to exist by the Commission which in its judgment requires the making of a rule, regulation or order without first having a hearing, such emergency rule, regulation or order shall have the same validity as if a hearing with respect to the same had been held after due notice. The emergency rule, regulation or order permitted by this section shall remain in force no longer than fifteen days from its effective date, and, in any event, it shall expire when the rule, regulation or order made after due notice and hearing with respect to the subject matter of such emergency rule, regulation or order becomes effective.

SECTION 16. The reports, estimates, findings of fact, or similar documents or findings of the United States Bureau of Mines, or any other department or agency of the United States Government, or any bureau or agency under an interstate compact to which the State of New Mexico is a party, made with respect to the reasonable market demand for crude petroleum oil, may be considered by the Commission or by any court and taken as being prima facie correct.

SECTION 17. Any person or party in interest adversely affected by any statute of this state with respect to conservation of oil or gas or both, or by any provision of this act, or by any rule, regulation or order made by the Commission thereunder, or by any act done or threatened thereunder, and who has exhausted his administrative remedy, may seek court review and relief by a suit for injunction against the Commission as defendant or the members thereof by suit in the District Court of Santa Fe County or in the district court of the county where the plaintiff, or one of the plaintiffs resides, or in the district court of the county where any property adversely affected may be situate. Such suit shall have precedence over all other causes, proceedings or suits on the docket of a different nature, and the Attorney General may have the case set for trial, after ten days notice to the plaintiff or his attorney. In such trial, the burden of proof shall be upon the plaintiff. The statute, provision of this act, or the rule, regulation, or order, complained of, shall be taken as prima facie valid, and such prima facies shall not be overcome, in connection with any application for injunctive relief, including temporary restraining order, by verified bill or by affidavit of, or in behalf of, the applicant.

SECTION 18. No temporary restraining order or injunction of any kind shall be granted against the Commission or the members thereof, or against the Attorney General, or against any agent, employee, or representative of the Commission, restraining the Commission, or any of its members, or any of its agents, employees or representatives, or the Attorney General, from enforcing any statute of this state relating to conservation of oil or gas, or any of the provisions of this act, or any rule, regulation or order made thereunder, except after due notice to the members of the Commission, and to all other defendants, and after a hearing at which it shall be clearly shown to the court that the act done or threatened is without sanction of law, or that the provision of this act, or the rule, regulation, or order complained of, is invalid, and that, if enforced against the complaining party, will cause an irreparable injury. With respect to an order or decree granting temporary injunctive relief, the nature and extent of the probable invalidity of the statute, or of any provision of this act, or of any rule, regulation or order thereunder involved in such suit, must be recited in the order or decree granting the temporary relief, as well as a clear statement of the probable damage relied upon by the court as justifying temporary injunctive relief.

No temporary injunction of any kind, including a temporary restraining order against the Commission or the members thereof, or its agents, employees or representatives, of the Attorney General, shall become effective until the plaintiff shall execute a bond to the state with sufficient surety in an amount to be fixed by the court reasonably sufficient to indemnify all persons who may suffer damage by reason of the violation pendente lite by the complaining party of the statute or the provisions of this act or of any rule, regulation or order complained of.

Any person so suffering damage may bring suit thereon before the expiration of six months after the statute, provision, rule, regulation or order complained of shall be finally held to be valid, in whole or in part, or such suit against the Commission, or the members thereof, shall be finally dismissed. Such bond shall be approved by the judge of the court in which the suit is pending, and shall be for the use and benefit of all persons who may suffer damage by reason of the violation pendente lite of the statute, provision, rule, regulation or order complained of in such suit, and who may bring suit within the time prescribed by this section; and such bond shall be so conditioned.

From time to time, on motion and with notice to the parties, the court may increase or decrease the amount of the bond and may require new or additional sureties, as the facts may warrant.

SECTION 19. Whenever it shall appear that any person is violating, or threatening to violate, any statute of this state with respect to the conservation of oil and gas, or both, or any provision of this act, or any rule, regulation or order made thereunder, the Commission, through the Attorney General, shall bring suit against such person in the District Court of Santa Fe County, or in the county of the residence of the defendant, or in the county of the residence of any defendant if there be more than one defendant, or in the county where the violation is alleged to have occurred, for penalties, if any are applicable, and to restrain such person from continuing such violation or from carrying out the threat of violation. In such suit the Commission may obtain injunctions, prohibitory and mandatory, including temporary restraining orders and temporary injunctions, as the facts may warrant, including, when appropriate, an injunction restraining any person from moving or disposing of illegal oil or illegal oil product, and any or all such commodities may be ordered to be impounded or placed under the control of an agent appointed by the court if, in the judgment of the court, such action is advisable.

SECTION 20. Nothing in this act contained or authorized, and no suit by or against the Commission, and no penalties imposed or claimed against any person for violating any statute of this state with respect to conservation of oil and gas, or any provision of this act, or any rule, regulation or order issued thereunder, shall impair or abridge or delay any cause of action for damages which any person may have or assert against any person violating any statute of this state with respect to conservation of oil and gas, or any provision of this act, or any rule, regulation or order issued thereunder. Any person so damaged by the violation may sue for and recover such damages as he may be entitled to receive. In the event the Commission should fail to bring suit to enjoin any actual or threatened violation of any statute of this state with respect to the conservation of oil and gas or of any provision of this act, or of any rule, regulation or order made thereunder, then any person or party in interest adversely affected by such violation, and who has notified the Commission in writing of such violation or threat thereof and has requested the Commision to sue, may, to prevent any or further violation, bring suit for that purpose in the District Court of any county in which the Commission could have brought suit. If, in such suit, the court holds that injunctive relief should be granted, then the Commission shall be made a party and shall be substituted for the person who brought the suit, and the injunction shall be issued as if the Commission had at all times been the complaining party.

SECTION 21. The violation by any person of an order of the court relating to the operation of a well or wells, or of a pipe line or other transportation, equipment or facility, or of a refinery, or of a plant of any kind, shall be sufficient ground for the appointment of a receiver with power to conduct operations in accordance with the order of the court.

SECTION 22. Any person who, for the purpose of evading this act, or of evading any rule, regulation or order made hereunder, shall intentionally make or cause to be made any false entry or statement of fact in any report required to be made by this act or by any rule, regulation or order made hereunder; or who, for such purpose, shall make or cause to be made any false entry in any account, record or memorandum kept by any person in connection with the provisions of this act or of any rule, regulation or order made thereunder; or who, for such purpose, shall omit to make, or cause to be omitted, full, true and correct entries in such accounts, records of memoranda, of all facts and transactions pertaining to the interest or activities in the petroleum industry of such person as may be required by the Commission under authority given in this act or by any rule, regulation or order made hereunder; or who, for such purpose, shall remove out of the jurisdiction of the state, or who shall mutilate, alter, or by any other means falsify, any book, record, or other paper pertaining to the transactions regulated by this act or by any rule, regulation or order made hereunder, shall be deemed guilty of a felony and shall be subject, upon conviction in any court of competent jurisdiction, to a fine of not more than One Thousand ($1,000.00) Dollars,or imprisonment for a term of not more than three years, or to both such fine and imprisonment.

Any person who violates any provision of this act or any rule, regulation or order of the Commission made hereunder, shall, in the event a penalty for such violation is not otherwise provided for herein be subject to a penalty of not to exceed One Thousand ($1,000.00) Dollars a day for each and every day of such violation and for each and every act of violation, such penalty to be recovered in a suit in the District Court of Santa Fe County, or in the District Court of the County where the defendant resides, or in the county of the residence of any defendant if there be more than one defendant, or in the District Court of the County where the violation took place. The place of suit shall be selected by the Commission, and such suit, by direction of the Commission, shall be instituted and conducted in the name of the Commission by the Attorney General or under his direction by the district attorney of the county where the suit is instituted. The payment of any penalty as provided for herein shall not have the effect of changing illegal oil into legal oil, or illegal oil product into legal oil product, nor shall such payment have the effect of authorizing the sale or purchase or acquisition, or the transportation, refining, processing, or handling in any other way, of such illegal oil or illegal oil product, but to the contrary penalty shall be imposed for each prohibited transaction relating to such illegal oil or illegal oil product.

Any person aiding or abetting any other person in the violation of any statute of this state relating to the conservation of oil or gas, or the violation of any provision of this act, or any rule, regulation or order made thereunder, shall be subject to the same penalties as are prescribed herein for the violation by such other person.

SECTION 23. Apart from, and in addition to, any other remedy or procedure which may be available to the Commission, or any penalty which may be sought against or imposed upon any person, with respect to violations relating to illegal oil or illegal oil product, all illegal oil and illegal oil product shall, except under such circumstances as are stated herein, be contraband and shall be seized and sold, and the proceeds applied as herein provided. Such sale shall not take place unless the court shall find in the proceeding provided in this paragraph, that the owner of such illegal oil or illegal oil product is liable, or in some proceeding authorized by this act, such owner has already been held to be liable, for penalty for having produced such illegal oil, or for having purchased or acquired such illegal oil or illegal oil product. Whenever the Commission believes that illegal oil or illegal oil product is subject to seizure and sale, as provided herein, it shall, through the Attorney General, bring a civil action in rem for that purpose in the District Court of Santa Fe County, or in the District Court of the County where the commodity is found, or the action may be maintained in connection with any suit or cross-action for injunction or for penalty relating to any prohibited transaction involving such illegal oil or illegal oil product. Notice of the action in rem shall be given in conformity with the law or rule applicable to such proceeding. Any person or party in interest who may show himself to be adversely affected by any such seizure and sale shall have the right to intervene in said suit to protect his rights.

Whenever the pleading with respect to the forfeiture of illegal oil or illegal oil product shows ground for seizure and sale, and such pleading is verified or is supported by affidavit or affidavits, or by testimony under oath, the court shall order such commodity to be impounded or placed under the control, actual or constructive, of the court through an agent appointed by the court.

The judgment effecting the forefeiture shall provide that the commodity be seized, if not already under the control of the court, and that a sale be had in similar manner and with similar notice as provided by law or rule with respect to the sale of personal property under execution: provided, however, the court may order that the commodity be sold in specified lots or portions, and at specified intervals, instead of being sold at one time. Title to the amount sold shall pass as of the date of seizure. The judgment shall provide for payment of the proceeds of the sale into the Common School Fund, after first deducting the costs in connection with the proceedings and the sale. The amount sold shall be treated as legal oil or legal oil product, as the case may be, in the hands of the purchaser, but the purchaser and the commodity shall be subject to all applicable laws, and rules, regulations and orders with respect to further sale or purchase or acquisition, and with respect to the transportation, refining, processing, or handling in any other way, of the commodity purchased.

Nothing in this section shall deny or abridge any cause of action a royalty owner, or any lien holder, or any other claimant, may have, because of the forfeiture of the illegal oil or illegal oil product, against the person whose act resulted in such forfeiture.

SECTION. 24. Unless the context otherwise requires, the words defined in this section shall have the following meaning when found in this act, to-wit:

(a) "Person" means any natural person, corporation, association, partnership, receiver, trustee, guardian, executor, administrator and fiduciary of any kind.

(b) "Pool" means an underground reservoir containing a common accumulation of crude oil or natural gas or both. Each zone of a general structure, which zone is completely separated from any other zone in the structure, is covered by the word "pool" as used herein.

(c) "Field" means the general area which is underlaid or appears to be underlaid by at least one pool; and "field" also includes the underground reservoir or reservoirs containing such crude petroleum oil or natural gas, or both. The words "field" and "pool" mean the same thing when only one underground reservoir is involved; however, "field" unlike "pool" may relate to two or more pools.

(d) "Product" means any commodity or thing made or manufactured from crude petroleum oil or natural gas, and all derivatives of crude petroleum oil or natural gas, including refined crude oil, crude tops, topped crude, processed crude petroleum, residue from crude petroleum, cracking stock, uncracked fuel oil, treated crude oil, fuel oil, residum, gas, oil, naptha, distillate, gasoline, kerosene, benzine, wash oil, waste oil, lubricating oil, and blends or mixtures of crude petroleum oil or natural gas or any derivative thereof.

(e) "Owner" means the person who has the right to drill into and to produce from any pool, and to appropriate the production either for himself or for himself and another.

(f) "Producer" means the owner of well or wells capable of producing oil or natural gas or both in paying quantities.

SECTION 25. There is hereby levied a tax of one-eighth of one percent on the proceeds of all oil and gas produced in this State, except royalties payable to the United States or to this state. Such tax shall be reported and collected at the same time and in the same manner as the emergency school tax now or hereafter provided by law, is returned and collected. Such tax when collected shall be paid to the State Treasurer and by him covered into a fund designated as the Oil Conservation Fund. Such fund or so much thereof as may be necessary, is hereby appropriated to the Oil Conservation Commission to be by it expended in the enforcement of this act. The Commission is hereby authorized, within the limits of the fund available, to employ a secretary and such other employees and agents as may be necessary to enforce the provisions of this act.

SECTION 26. Sections 97–201 to 97–204, inclusive, and Sections 97–102 to 97–109, inclusive, of the New Mexico Statutes, Annotated, Compilation of 1929, and Sections 97–601 and 97–602 of New Mexico Statutes, Annotated, Compilation of 1929, are hereby repealed.

SECTION 27. If any part or parts of this act be held to be unconstitutional, such unconstitutionality shall not affect the validity of the remaining portions of this act. The legislature hereby declares that it would have passed the remaining parts of this act if it had known that such part or parts thereof would be declared unconstitutional.

SESSION LAWS OF NEW MEXICO, 1937, CHAPTER 193

AN ACT Relating to the conservation, regulation, and prevention of waste of carbon dioxide gas; giving the Oil Conservation Commission authority to regulate, conserve, and prevent waste of carbon dioxide gas; making certain provisions of chapter 72, New Mexico session laws of 1935, applicable to carbon dioxide gas; amending chapter 72, New Mexico session laws of 1935, by adding a new section thereto; and declaring an emergency

House Bill No. 207; Approved March 15, 1937

Be It Enacted by the Legislature of the State of New Mexico:

SECTION 1. That Chapter 72, New Mexico Session Laws of 1935, be and the same hereby is amended by adding to said Chapter a new Section 28, to read as follows:

"Section 28. The Oil Conservation Commission is hereby vested with the authority and duty of regulation and conserving the production of and preventing waste of carbon dioxide gas within this state in the same manner, insofar as is practicable as it regulates, conserves, and prevents waste of natural or hydrocarbon gas. The provisions of this act (Chapter 72—New Mexico Session Laws of 1935) relating to gas or natural gas shall also apply to carbon dioxide gas insofar as the same are applicable. Carbon dioxide gas as used herein shall mean non-combustible gas composed chiefly of carbon dioxide occurring naturally in underground rocks."

SECTION 2. That it is necessary for the preservation of the public peace an safety of the inhabitants of the State of New Mexico that the provisions of thi act shall become effective at the earliest possible time, and therefore an emergenc is hereby declared to exist, and this act shall take effect and be in full force and effect from and after its passage and approval.

OIL CONSERVATION COMMISSION

INTRODUCTION

Pursuant to power delegated by an Act of the Twelfth Regular Session of the Legislature of the State of New Mexico, Chapter 72, Laws of 1935, especially the power delegated by Sections 9 and 10 thereof, the Oil Conservation Commission of the State of New Mexico, hereinafter designated as the "Commission," hereby and herein makes and promulgates the following general rules and regulations which are found by the Commission, after notice and hearing as required by law, held at Santa Fe, New Mexico, June 28th, 1935, to be reasonably necessary to prevent present and imminent waste of oil and gas, as defined by law, and otherwise to carry out the purposes of said Act. These rules and regulations shall become effective August 12, 1935.

RULE 1. *Sign on wells.*—Every well shall be identified by a sign, posted on the derrick if possible, otherwise on a substantial post not more than twenty feet from such well, and such signs shall be of durable construction and the lettering thereon shall be kept in a legible condition and shall be large enough to be legible under normal conditions at a distance of fifty feet. The wells on each lease or property shall be numbered consecutively beginning with No. 1, unless some other system of numbering was adopted by the owner prior to the adoption of these rules and regulations. Each sign shall show the number of the well, the name of the lease (which shall be different for each lease), the name of the lessee, owner or operator, and the location by quarter, section, township and range.

RULE 2. *General spacing rule.*—The rules for the spacing of oil and gas wells are as follows:

(a) "Wildcat" wells shall not be drilled closer than 330 feet to any lease or property line or less than 660 feet from any other well. "Wildcat" wells, according to the meaning used herein, shall be those which are located not less than two miles from any commercial or potentially commercial oil or gas well, and that are outside the boundaries of proven oil or gas fields or areas that may be designated by the Commission. Plugged and abandoned wells shall not be considered in applying this rule.

The Commission may, after notice and hearing, grant exceptions to this rule, provided such exceptions will create neither waste nor hazards conducive to waste. Such exceptions may be granted when surface conditions render it impracticable without unreasonable expense to drill a well at a location in conformity with this rule, or when a separately owned tract is so small or so shaped that a location in conformity with this rule is impossible.

(b) The foregoing rule with reference to "Wildcat" wells shall also apply to all other wells, unless and until the Commission, after notice and hearing, adopts special rules for the spacing of wells in proven oil or gas fields or in areas that the Commission may designate.

RULE 3. *Well record.*—During the drilling of every well, the owner, operator, contractor, driller, or other person responsible for the conduct of drilling operations, shall keep at the well a detailed and accurate record of the well, reduced to writing from day to day, which shall be accessible to the Commission and its agents at all reasonable times. A copy of the record shall be furnished to the Commission at its request, but shall be kept confidential, if the operator so requests in writing, for a period not to exceed ninety days after the completion of the well, provided that the report or data therein, when pertinent, may be introduced in evidence in any public hearing before the Commission or any Court, regardless of the request that the report be kept confidential.

If so ordered by the Commission, samples of drill cuttings shall be kept in the State by the owner of the well and shall be accessible to the Commission and its agents at all reasonable times.

RULE 4. *Deviation tests.*—Whenever any well is drilled or deepened, tests to determine the deviation from the vertical shall be taken at intervals of not more than 500 feet. Directional surveys may be required by the Commission whenever in its judgment the location of the bottom of the well is in doubt.

RULE 5. *Pit for shale drill cuttings required.*—During the drilling of any well, all clay and soft shale drill cuttings shall be accumulated in an adequate pit provided before drilling is commenced, in order to assure a supply of proper material for mud-laden fluid to confine oil, gas, or water to their native strata.

RULE 6. *Strata to be sealed off.*—Before any oil or gas well is completed as a producer, all oil, gas, and water strata above the producing horizon shall be sealed or separated in order to prevent their contents from passing into other strata.

RULE 7. *Shooting and chemical treating of wells.*—Wells shall not be shot or chemically treated until the permission of the Commission is obtained. Each well shall be shot or treated in such manner as will not cause injury to the sand, or result in water entering the oil or gas sand, and necessary precautions shall be taken to prevent injury to the casing. If shooting or chemical treating results in irreparable injury to the well or to the oil or gas sand, the well shall be properly plugged and abandoned. (See Rule 42.)

RULE 8. *Water shut-offs.*—All water shall be shut off and excluded by a method approved by the Commission from the various oil and gas bearing strata which are penetrated. Water shut-offs shall ordinarily be made by cementing casing or landing casing with or without the use of mud-laden fluid. Drilling shall not be resumed following the landing or cementing of each string of casing until proof is obtained satisfactory to the Commission of a proper oil and gas and water shut-off.

RULE 9. *Mud-laden fluid.*—Mud-laden fluid is a term used herein to designate any mixture of water and finely divided or colloidal material that remains in suspension for a long time. The mud employed shall have suitable physical and chemical properties to accomplish adequately the purpose for which the mud is used.

RULE 10. *Use of mud-laden fluid in setting casings.*—In order to seal off any oil, gas, or water stratum during drilling, the owner shall, if the Commission so requires, run the casing and seat it in mud-laden fluid, which fluid shall fill the hole outside the casing to the top, where the level of said fluid shall be maintained.

RULE 11. *Pulling outside strings of casing.*—In pulling any outside strings of casing from any oil or gas well, the space outside the casing left in the hole shall be kept and left full of mud-laden fluid of adequate specific gravity to seal off all fresh and salt water strata and any strata bearing oil or gas not producing.

RULE 12. *Abandoning wells.*—Before a well is abandoned, it shall be plugged in a manner which will confine permanently all, oil, gas, and water in the separate strata originally containing them. This operation shall be accomplished by the use of mud-laden fluid, cement, and plugs, used singly or in combination as may be approved by the Commission. The exact location of abandoned wells shall be shown by a steel marker at least four inches in diameter set in concrete, and extending at least four feet above mean ground level.

RULE 13. *Blow-out prevention.*—In drilling in areas where high pressures are likely to exist, all proper and necessary precautions shall be taken for keeping the well under control, including the use of blow-out preventers and high-pressure fittings attached to proper anchored and cemented casing strings.

RULE 14. *Casing requirements for oil and gas production.*—Oil wells shall be completed with an oil string of casing which shall be properly cemented at a sufficient depth adequately to protect the oil-bearing stratum. Gas-producing wells shall be cased in a similar manner.

RULE 15. *Oil tanks and fire walls.*—Oil shall not be stored or retained in earthen reservoirs. or in open receptacles. All lease, stock, and oil-storage tanks shall be protected by a proper fire wall, which wall shall form a reservoir having a capacity one-third larger than the capacity of the enclosed tank or tanks. Such tanks shall not be erected, enclosed or maintained closer than 150 feet the nearest producing well.

RULE 16. *Emulsion, B. S., and waste oil.*—Wells producing oil shall be operated in such manner as will reduce as much as practicable the formation of emulsion and B. S. These substances and waste oil shall not be allowed to pollute streams or cause surface damage.

RULE 17. *Use of vacuum pumps.*—Vacuum pumps or other devices shall not be used for the purpose of creating a partial vacuum in any stream containing oil and gas.

RULE 18. *Protection of fresh and artesian waters.*—All fresh waters and waters of present or probable future value for domestic, commercial, or stock purposes shall be confined to their respective strata and shall be adequately protected by methods approved by the Commission. Special precautions shall be taken in drilling and abandoning wells to guard against any loss of artesian water from the strata in which it occurs, and the contamination of artesian water by objectionable water, oil, or gas.

RULE 19. *Burning of gas.*—All gas produced in the operation of oil wells that cannot be utilized shall be burned.

RULE 20. *Protection of mineral deposits.*— Due precautions shall be taken during the drilling of a well, and in all subsequent operations, to protect any deposits of salt, potash, coal, and other minerals of probable commercial importance encountered in the well.

RULE 21. *Written notices, requests, and reports.*—The following forms shall be used in giving notices and making requests and reports to the Commission. In the case of wells on lands belonging to the United States, copies of notices and reports to the proper officials of the United States will be accepted in lieu of these forms.

Form C–101. Notice of Intention to Drill.
Form C–102. Miscellaneous Notices.
Form C–103. Miscellaneous Reports on Wells.
Form C–104. Operator's Monthly Report of Operations.
Form C–105. Well Record.
Form C–106. Request for Permission to Connect with Pipe Line.
Form C–107. Purchaser's Monthly Report.

RULE 22. *Notice of intention to drill* (*Form C–101*).—Before beginning drilling• the owner of the well shall give notice thereof by filing with the Commission in triplicate Form C–101, Notice of Intention to Drill. A copy of the notice will be returned by the Commission to the applicant, on which will be noted the Commission's approval with any modifications considered advisable, or the rejection of the plan submitted. The program, as approved, shall be followed as far as practicable. Drilling shall not begin until this approval is obtained and until a bond has been submitted and approved as required by Rule 39.

The information required on Form C–101 includes the name and number of the well, exact location, status of land (whether State, Federal, or privately owned), type of drilling equipment to be used, proposed casing program, probable depth to first productive oil or gas sand, and any additional pertinent information.

RULE 23. *Report on beginning drilling operations* (*Form C–103*).—Within ten days after drilling operations are begun, the owner of the well shall file with the Commission a report on Form C–103, Miscellaneous Reports on Wells. It shall give the date when operations were begun, the elevation of derrick floor above sea level, and any changes made in the program previously specified on Form C–101. It shall be submitted in triplicate and signed and sworn to before a notary public.

RULE 24. *Notice of intention to shoot or chemically treat well* (*Form C–102*).—Before shooting or chemically treating a well, the owner shall file in triplicate with the Commission a notice to that effect on Form C–102, Miscellaneous Notices. A copy will be returned to the owner on which will be noted the Commission's approval, with any modifications considered advisable, for the program submitted, or its rejection. The plan of work as approved shall be followed, and work shall not begin until approval is obtained. This form shall be used for all shooting and chemical treating during drilling and subsequent operations unless the information required is included in another notice.

The notice shall give the name, number, and location of the well, the present daily production of oil, gas, and water, the detailed history of any water encountered, the formation to be shot or chemically treated and its top and bottom depths, the depth at which the inner string of casing is set, the size and purpose of the shot or chemical treatment, and any additional pertinent information. (See Rule 42.)

RULE 25. *Report of result of shooting or chemical treatment of well* (*Form C–103*).—Within twenty days after the shooting or chemical treatment of a well, a report shall be filed with the Commission in triplicate by the owner on Form C–103, Miscellaneous Reports on Wells, giving the condition of the well after shooting or chemical treatment, the size and depth of the shot or amount of chemical used, the daily production of oil, gas, and water after shooting or chemical treatment, name of the person rendering this service, and any other pertinent information. This report shall be signed and sworn to before a notary public.

RULE 26. *Notice of intention to test casing shut-off* (*Form C–102*).—Before any casing is tested, the owner shall file in triplicate with the Commission a notice of intention to test casing shut-off on Form C–102, Miscellaneous Notices. The Commission will return to the owner a copy of the notice on which will be noted the Commission's approval, with any modification considered proper, of the plan submitted, or its rejection. The plan of work as approved shall be followed, and work shall not begin until this approval is obtained. This test shall be witnessed by an agent of the Commission or by some person authorized by the Commission; provided, however, that the owner shall not be required to suspend operations for more than twenty-four hours after the announced date of the test if such suspension of operations is caused by the failure of an agent of the Commission to appear to witness the test.

The information given in the notice shall include the name, number, and location of the well; the size, weight, and depth of casing; formation landed in; data on landing or cementing of the string of casing to be tested and quantity of cement used; method of testing; the total depth of well; and any other pertinent information.

RULE 27. *Report on result of test of casing shut-off (form C–103).*—A report on the result of test of casing shut-off shall be filed with the Commission in triplicate within ten days after the completion of work on Form C–103, "Miscellaneous Reports on Wells." It shall indicate any changes made in the approved plan outlined previously on Form C–102. It shall also give a detailed report of the method used and of the results obtained and any other pertinent information. Name of the witness shall be given on the report, and it shall be signed and sworn to before a notary public.

RULE 28. *Notice of intention to plug well (Form C–102).*—Before plugging a well, notice shall be given to the Commission by filing in triplicate Form C–102, "Miscellaneous Notices." Work shall not begin until approval is obtained. A copy of the notice will be returned to the owner, on which will be given the approval of the Commission of the plugging plan submitted with any modifications considered essential. The notice shall give a detailed statement of the proposed work; including length and depth of plugs; plans for mudding, cementing, shooting, testing and removing casing; and the date of the proposed plugging operations. Before plugging any well, the owner shall give notice to all available adjoining lease and property owners, and representatives of such adjoining lease and property owners may be present to witness the plugging, if they so desire, but plugging shall not be delayed because of inability to deliver notice to adjoining lease or property owners.

It not previously filed, a complete log of the well on Form C–105 shall accompany the notice of intention to plug the well.

RULE 29. *Report on results of plugging well (Form C–103).*—Within ten days after plugging a well, a record of the work done shall be filed in triplicate by the owner with the Commission on Form C–103, "Miscellaneous Reports on Well." The report shall give the date the work was started and the date it was completed; a detailed account of the manner in which the work was performed; the nature and quantities of materials used in plugging, and the depths and lengths of the various plugs; records of any tests or measurements made; the amount, size and depth of all casing left in the well; the volume and gravity of mud-laden fluid used; pressures retained in mudding; a complete record of any shooting done; and names, addresses and positions of all those in charge of the work. The report shall be signed and sworn to before a notary public.

RULE 30. *Miscellaneous notices (Form C–102).*—Form C–102, "Miscellaneous Notices," shall be filed by the owner in triplicate with the Commission and approval obtained from it before starting operations leading to a proposed change of drilling plan, repairing or deepening a well, pulling or altering casing, plugging back, redrilling, or starting any other similiar operations not specifically covered herein. A copy of the notice giving the decision of the Commission will be returned to the owner.

RULE 31. *Miscellaneous report on wells (Form C–103).*—Form C–103, "Miscellaneous Reports on Wells," shall be used for reports on various operations which have been approved by the Commission and which are not provided for on other forms. The report with respect to each such operation shall be filed with the Commission within ten days after such operation is completed. If the program previously approved in connection with the work has been followed exactly, the report may so state. The results of the work shall be given in detail and also any variations from the approved plan. The report shall be signed and sworn to before a notary public.

RULE 32. *Well record (Form C–105).*—Within twenty days after the completion of a well, the complete record, duly signed and sworn to, shall be filed in triplicate with the Commission on Form C–105, "Well Record." Questionable data shall be indicated by following it with a question mark. The well record shall not be kept confidential by the Commission unless requested in writng by the owner of the well. Upon such request the Commission will keep the report confidential for ninety days from the date of the completion of the well; provided, however, that the report or data therein when pertinent may be introduced in any public hearing before the Commission or any Court regardless of the request that the report be kept confidential.

The well record shall include the name, number and location of the well; whether the land on which it is located is Federal, State or privately owned; drilling dates; elevation; depth and thickness of oil or gas sands and important water sands; a full casing record; mudding and cementing record; shooting and treating record; plugs and adapters used; results of drill stem and other tests; records of deviation surveys; tools used; production record for first 24 hours; names of contractors and drillers; and a complete log or formation record giving in detail the formations passed through, their depths and thickness. The log shall specify the formations yielding water, the rate of water inflow, and the elevation to which water rose in the hole. It shall give data regarding upper oil and gas shows, and any additional pertinent information.

RULE 33. *Supplementary well history* (*Form C–103*).—A report in triplicate on all work done on wells following the submitting of the complete well record on Form C–105 shall be filed by the owner with the Commission within ten days after the completion of the new work on Form C–103, "Miscellaneous Reports on Wells." The report shall be signed and sworn to before a notary public.

RULE 34. *Operator's monthly report of operations* (*Form C–104*).—A report shall be made for each calendar month for all drilling and producing wells and wells not finally abandoned on Form C–104, "Operator's Monthly Report of Operations." It shall be filed in triplicate by the operator with the Commission covering each calendar month, before the 25th day of the succeeding month, regardless of the status of operations. A separate form shall be filed for each lease. The number and location of each well shall be given. Data in addition to that specified below may be called for.

For drilling wells the report shall include for each well the number of days during which drilling operations were conducted, progress for the month, and depth of the well at the end of the month. For wells on which drilling operations were discontinued, the cause shall be given.

For wells producing oil, the report shall give for each well where such data is available, otherwise for the group of wells on a lease or segregated tract, the number of barrels of oil produced, the gravity of the oil and the estimated number of barrels of water produced. The report shall also state the number of days each well produced, and if a well was shut down, that fact shall be stated and the cause of shut-down given. The total production for the month shall be divided into pipe line runs, local sales, amount used in developing or operating the lease, and any miscellaneous dispositions.

For wells producing gas, the report shall give for each well if such data is available, otherwise for the group of wells on a lease or segregated tract, the number of thousands of cubic feet produced; also the producing well-head pressure or pressures of each well. If gasoline was extracted from any of the gas, the report shall give the estimated content of gasoline per thousand feet of gas processed for gasoline, according to the last information available to the operator, and the actual (or if the actual is not available, the estimated) volume of gas processed for gasoline. If any gas wells were shut down that fact shall be stated, and the cause of the shut-down shall be given, and the static pressure last taken of the shut-down well shall be noted.

For wells producing oil and gas, data as outlined above shall be given for both oil and gas.

RULES 35. *Request for permission to connect with pipe line* (*form C–106*).—Oil or gas wells or tanks on leases shall not be connected with pipe lines, nor shall connections with pipe lines be changed, until permission is granted by the Commission. This rule shall not apply to temporary changes in connections in the field to take care of current pipe line requirements. Requests for permission shall be made in triplicate by the lessee or operator to the Commission on Form C–106, "Request for Permission to Connect With Pipe Line." The request shall include the name, number and location of the well or wells, and the location and description of tanks, and it shall specify that all rules, regulations and orders in reference to the location, drilling, casing and completion of the well or wells, and all requirements in connection with production, have been complied with. Temporary connection with a pipe line may be made in advance of permission, if necesssry in order to take care of production and avoid waste. If the Commission has reason to believe that the application for permission to connect with the pipe line should be disapproved, because of failure of the lessee or operator to comply with some rule, regulation or order in reference to the location, drilling, casing, or completion of the well, the Commission shall call a hearing, and if it finds that the application should be disapproved, it shall direct the pipe line company by written order, to disconnect its line from the well or wells or lease tanks to which it was temporarily connected.

Rule 36. *Purchaser's monthly reports (Form C–107).*— Purchasers of crude oil, produced in the State of New Mexico, shall make monthly reports of all such crude oil purchased or received from their own or outside connected leases, or any other source, to the Commission on Form C–107. The report of a purchaser, covering purchases during one month, shall be filed not later than the 20th day of the succeeding month and shall be sworn to by the purchaser or a responsible officer or designated agent of the purchaser.

Similar reports shall be submitted by all purchasers of gas produced within the State on Form C–107.

Rule 37. *Notifications of fires and blowouts at wells and breaks and leaks in pipe lines.*— Any person as defined in Chapter 72 aforesaid, drilling or operating wells or operating a pipe line, shall notify the Commission of fires or blowouts which occur at oil and gas wells or oil tanks owned, operated or controlled by them; tanks struck by lightning; other fires which destroy oil and gas; breaks or leaks in tanks or pipe lines from which oil or gas escaped or is escaping; and other serious accidents. Notification shall be by telephone or telegraph giving briefly the particulars and by letter giving a more detailed account of events and conditions. Reports of fires, blowouts, breaks or leaks in tanks or pipes or other accidents shall specify the location of the well, tank or pipe line break, giving the quarter, section, township and range. Notwithstanding any provision of this rule, no report need be made of any loss of oil be leakage or breakage of tanks or pipe lines where less than 100 barrels of oil was lost.

Rule 38. *Pipe line data required.*—Any person as defined in Chapter 72 aforesaid, intending to operate a pipe line, whether now existing or hereafter laid, shall notify the Commission in writing of such intention and shall state the size and location of the pipe line and its depth, the appurtenant tankage and location thereof, and any other pertinent data requested by the Commission, and shall furnish a map showing the location of the line and tankage. In the case of a line to be constructed, if any changes from the plan submitted are made during construction, the Commission shall be notified of such changes. The Commission shall also be notified of any subsequent alterations in pipe lines. Nothing contained in this rule shall apply to lease lines, which are merely used in the operation of the lease on which located, nor to any line or appurtenant tankage not located within the State of New Mexico.

Rule 39. *Bonds.*— Any person as defined in Chapter 72 aforesaid who has drilled or is drilling or proposes to drill for oil or gas shall submit to the Commission and obtain its approval of a bond, in a form approved by the Commission, conditioned to plug such well, if dry or when abandoned, in such way as to confine the oil, gas and water in the respective strata in which they are found, and to prevent them from escaping into other strata. The bond shall be in an amount determined by the Commission after taking into consideration the depth of the well and local conditions, but in no case shall the amount of the bond applicable to one well only be more than $10,000.00. Each such bond shall be executed by a responsible surety company, authorized to transact business in the State of New Mexico, or by not less than two individual sureties, each of whom shall own real estate situated within the state, and worth not less than twice the amount of the bond after deducting from the value of such property all exemptions and encumbrances. The ownership by each individual surety of property as aforesaid shall be evidenced to the Commission by a certificate from the Tax Assessor of the county wherein the land is situated or by an affidavit made by any District Judge having jurisdiction over such county, or by the affidavits of not less than two responsible residents of the State of New Mexico who have personal knowledge of the facts and so state in their affidavits. The Commission reserves the right to decline to approve any bond with individual sureties. In cases where the principal on the bond is drilling or operating a number of wells within the State or proposes to do so, such principal may, with the approval of the Commission, submit a blanket bond conditioned as above provided, covering all wells which such person may at any time before such bond is released, drill or operate within this State. The amount of any such blanket bond shall not be less than $10,000.00.

When the well or wells involved, or any such wells, are located on a State oil and gas lease, and the surface of the land involved was sold by the State prior to such oil and gas lease, such bond may, at the election of the principal, be conditioned not only for the plugging of such well or wells as above provided, but also to secure the payment of such damages to the livestock, range, water, crops or tangible improvements on such land as may be suffered by such purchaser or his successors in interest by reason of the development, use and occupation of such land resulting from such oil and gas leases.

Any bond conditioned as provided in the last preceding sentence must be approved, not only by the Commission, but by the Commissioner of Public Lands in his capacity as such.

All liability on bonds conditioned for the plugging of a well or wells shall continue until the plugging of such well or wells is completed and approved. Bonds conditioned to protect surface owners as aforesaid shall cover liability incurred during the entire period of oil and gas operations by the principal on the lands involved.

The Commission will in writing advise the principal and sureties on any bond conditioned to plug wells, as to whether the plugging is approved, in order that, if the plugging is approved, liability under such bond may be formally terminated.

Forms of bonds which will be acceptable will be furnished by the Commission.

Rule 40. *Special Rules and Regulations.*—The Commission shall adopt special rules and regulations for fields or areas when in its judgment such rules and regulations are required.

Rule 41. *Conflicts between general and special rules and regulations.*—In case of conflict between a general and a special rule or regulation, the special rule or regulation shall prevail without regard to the effective dates of the respective rules or regulations, unless the contrary is clearly prescribed by the Commission.

Rule 42. *Permissible exceptions to the rules and regulations.*—When emergencies arise during the drilling, operation or plugging of wells, and when compliance with the general rules and regulations or any special rules and regulations that are adopted by the Commission will cause material unnecessary and avoidable delay and expense, the conditions may be communicated to the Commission or its proper agents with the request that an exception be made to meet the particular emergency.

Rule 43. *Enforcement of laws, rules, and regulations dealing with conservation of oil and gas.*—The oil conservation laws and the general and special rules and regulations of the Commission shall be enforced by the Commission and its authorized agents. Orders of oil and gas inspectors and other agents should be obeyed immediately. These orders shall be subject to review by the Commission if an appeal is filed with it as soon as practicable, but the pendency of such an appeal shall not operate to excuse compliance with the order appealed from, unless the Commission or a majority thereof so direct.

Owners should obtain information from the Commission as to the Oil and Gas Inspector having direct supervision over their operations, where notices and reports should be sent, etc. Forms for submitting notices, requests, and reports can be obtained from the Commission at Santa Fe or from its designated agents.

Rule 44. *Notice to contractors, drillers, and others to observe rules.*—All contractors and drillers carrying on business or doing work in the oil and gas fields of the State and also all lease holders, land owners, and operators generally, are hereby directed to take notice of and comply with the rules and regulations of the Commission.

Rule 45. *Commission to co-operate with proper agents of the United States.*—The Commission and its agents shall co-operate and invite the co-operation of the agents of the Conservation Branch of the United States Geological Survey and other proper agents of the United States.

Mr. Cole. The committee wants to give all of the gentlemen here ample time to deliver their statements, but if all of them place estimates on their time as far wide of actual requirements as Mr. Dow has, I do not know when we will get through.

Colonel Thompson. Mr. Chairman, will it be possible for Judge Fouts to read his paper at the close of the compact presentation as part of the compact's presentation. Since Mr. Dow has already used the time that he wanted to have, Mr. Schoeppel is going to yield time to Judge Fouts.

Mr. Cole. Not at this time.

Colonel Thompson. Not now, but later on.

Mr. Cole. If we have time.

Colonel Thompson. Thank you.

Mr. Cole. I understand that some of the gentlemen want to get away this week, and we want to conclude tomorrow. I hope that we get into the compact hearing, Colonel Thompson, this afternoon.

It might be pretty late before we do. I must leave the meeting now. Mr. Kelly will take charge. I think we could get back here and start about 1:45 this afternoon and if the House does not interfere we can have a pretty long session this afternoon. We can go on now for a little while.

I am going to suggest that in view of some questions I asked Mr. Dow that Mr. Andreas and Mr. Staley, if they will, wait until this afternoon and the Reporter can let their testimony follow right after Mr. Dow's. I would like to hear their testimony, in view of some questions I have asked. We can go on with Kansas at this time, and then Montana and Oklahoma. Would that be agreeable?

Colonel THOMPSON. Yes, sir. Mr. Chairman, may I say we are in no rush. We are at the convenience of the committee. We do not want to rush the committee and we are at your convenience, all of us.

Mr. COLE. I understand, Colonel.

Colonel THOMPSON. We are in no rush to get away. We want to get this thing presented fully and completely.

Mr. COLE. And we want to give you time to do it.

Colonel THOMPSON. Governor Phillips asked me if I would carry on in his absence, and I hope you will not mind my saying that.

Mr. COLE. No, Colonel.

Colonel THOMPSON. All of the States want to give a full and complete explanation of their position and if the committee cannot go on now, we will yield to the committee's time, and we will wait for a more agreeable date.

Mr. COLE. The committee will not sit next week. On the 19th I agreed to hear the industry, the week of the 19th, and according to their line-up, which they have submitted to me, that will take some time.

Colonel THOMPSON. Mr. Chairman, we can go on next summer or any time. We are just in no hurry. Really we are not. We want to go into this thing fully.

Mr. COLE. It might be that we would be hearing you next summer, as well as now.

Colonel THOMPSON. Yes, sir; we have been talking about it for 5 years.

Mr. COLE. And we might as well extend it a little longer?

Colonel THOMPSON. Time is nothing to us.

Mr. COLE. Well, we do not have any place but here to be for the present [laughter].

PETROLEUM INVESTIGATION

THURSDAY, FEBRUARY 8, 1940

The subcommittee reassembled, pursuant to the taking of recess, at 1:45 p. m., Hon. William P. Cole, Jr., presiding.

Mr. COLE. The committee will please be in order. We will hear Mr. Andreas.

STATEMENT OF A. ANDREAS, STATE GEOLOGIST AND MEMBER OF OIL CONSERVATION COMMISSION OF NEW MEXICO

Mr. ANDREAS. My name is A. Andreas. I have a geological engineering degree from the New Mexico School of Mines, with 23 years' practice in my profession. My experience includes 3 years with the United States Geological Survey, 7 years' foreign service with the Standard Oil Co. of New Jersey, 8 years' consulting geological service for independent oil companies in the United States for the States of New Mexico, Oklahoma, Kansas, and Texas, and 3 years on the geological staff of the State Bureau of Mines of New Mexico.

I have been State geologist, and a conservation commissioner for the State of New Mexico since 1937.

My appearance before you is for the purpose of furnishing for your investigation a record of the conservation work of my State, together with statistical data and producing characteristics of the principal oil and gas fields of the State.

Conservation in the State of New Mexico is administered by a commission composed of the Governor, or his appointed representative, the State land commissioner, and the State geologist. The administration under the State geologist as director of conservation is divided into two branches: Division of oil and gas inspectors, and division of proration and engineering, under a deputy director.

The division of oil and gas inspectors makes reservoir energy surveys, through the medium of bottom-hole pressure, gas-oil ratio measurements, and evaluation of water drives; inspects cementing procedures of casing well completion methods, storage practices; and enforces the rules and regulations of the commission regarding waste.

Gas-oil ratios of all wells are taken immediately upon completion, and remedial work done for reduction of high gas-oil ratios, before the wells are placed upon the allocation schedule.

The commission has learned long since that production methods can be maintained upon an efficient basis, and still have increasing gas-oil ratios, the ratio usually increasing with the depletion of the field. This is a matter of reservoir mechanics, and cannot be changed by legislative fiat or arbitrary gas-oil ratio order. Furthermore, the commission has learned through experience that increasing gas-oil ratios with the decline of a field are not necessarily connected with waste. This is particularly true in those fields having a strong water drive. Although the argument has often been advanced that all fields should be produced at their gas-in-solution ratio, it has been found by experience that this is an impossibility, except during short periods in those fields, such as East Texas, that have an abundant water drive with an undersaturated gas-in-solution condition.

That is, in those fields where the saturation conditions are such that an appreciable pressure drop can be had without gas coming out of solution. New Mexico fields have been found, generally, to contain gas in solution at a fully saturated state; that is, the gas begins to come out of solution at the slightest pressure drop from the initial bottom hole pressure. Due to this physical phenomenon, as the pressure drops in the reservoir, gas comes out of solution from the oil remaining unproduced within the reservoir.

A part of this gas finds its way to the high points within the reservoir, creating gas caps, while the remaining portion intermingles with the oil within the formational pores, being held back on account of porosity and permeability conditions, from reaching gas cap area. The gas so trapped within the oil formation finds its way to the bore hole with the oil, and cannot be wholly separated even though submergence be maintained on the tubing. To lay down a legislative mandate that no fields shall be produced except at gas in solution gas-oil ratio rates is to command an operator to produce his oil in defiance of nature and her physical laws.

To carry out such a mandate would result, in practically all fields in restrained production extending over a period of geologic time, even then the requirements of such an edict would not be fulfilled. To argue that such a procedure is at all possible, and that the production of oil at fixed gas-oil ratios for a field shall be carried out, is to take a theoretical and academic stand which cannot be supported by facts or practical experience.

It is because of a recognition of these factors that the inspectors of the Commission classify high gas-oil ratio wells by standards which change periodically, varying with time, and with the pools' varying total outlet, and proceed with remedial work on those wells classified under the ratio standards currently recognized.

The deputy director, who is a qualified geologist, assisted by petroleum engineers, makes petroleum engineering studies of the various fields of the State, including evaluation of reservoir energy; formation of gas caps, intrusion of water; and other factors and characteristics of producing reservoirs directly pertinent to the administration of conservation laws.

This division issues a monthly engineering report covering well completions, gas-oil ratio and water reports; remedial work done; bottom-hole pressures taken; oil, gas and water production by wells, by fields, and by companies, for the preceding month, along with detailed pipe-line runs for the State. It also gives the proceedings of all engineers and operators' meetings held within the State, records discussions had, abstracts of papers read, and recommendations made. All orders of the conservation commission are also included in this monthly report, which is available to the industry usually by the 10th of the succeeding month.

In addition to the conservation forces of the State, the operators advisory committee, composed of the oil operators of the State, and the engineering advisory committee, composed of engineers employed by the oil operators of the State, make independent studies and submit independent recommendations to the conservation body regarding the current operating problems in the various fields. The recommendations of the operators and the operators engineering committee are welcomed by the commission, given careful consideration and study, but the commission's action is always taken after weighing the interests of the operators and the interests of the State on a basis of true, but not theoretical or academic conservation. In other words, the commission administers its proration rules and regulations, as the record will show, not as advised by the operators in every case, but upon the basis of its own judgment backed by the years of experience and training of its personnel.

The problem of controlling gas-oil ratios in New Mexico is an exceedingly difficult one. The commission realizes that the engineering advisory committee has back of it the combined talent and experience of huge engineering and research staffs, representing investments of millions of dollars, which the State, nor the Federal Government for that matter, could not hope to duplicate.

May I pause to ask, How can the Secretary, through the Bureau and other petroleum agencies, spending $1,400,000 each year, hope to guide to improved methods or decide questions of waste, which can be determined only through research, and an industry which, according to the American Petroleum Institute, has a total investment of $15,000,000,000, an annual pay roll of a billion and a half dollars, expenditure of $12,000,000 a year in research, and pays Government taxes of a billion and a half dollars each year? With the combined facilities of research and engineering personnel of such an enormous industry working night and day to overcome, through new and better methods, the handicap of an enormous tax burden, what guidance can the Secretary offer, even though his engineers be competent, yet so bound by red tape that they have trailed the advances of the industry for years with post-mortem reports? In our opinion, it would take the Secretary years, if ever, and the expenditure of huge sums of money, to come abreast of the industry in its research work, and then the effort could be nothing more than a duplication.

The commission is glad to make use of this engineering and research talent in the installation of packers for the reducing of gas-oil ratios and for controlling water encroachment; for bottom-hole pressure surveys, to determine the loss of reservoir energy in relation to the oil, gas, and water produced; to outline casing programs; and to limit the depths to which wells may penetrate in particular reservoirs; to make subsurface temperature surveys to locate casing leaks; gas-oil contacts, water-oil contacts; and to make studies and recommendations for the use of high-pressure well equipment. But the commission has reserved, in each case, its right to take independent action, and act upon its own judgment after weighing all the evidence.

The conservation law provides that the commission may require pooling of small tracts to the size of a well spacing unit. It also provides that no operator shall be denied the right to drill on his property, however, small, but his allowable from such a tract is limited by law to its proportionate part. Because of this provision in the law, that allowables from wells on small tracts must be held down to their proportionate part of a unit, on an acreage basis, there has been no request for fractional tract wells in the State. Consequently, each pool has been developed on a uniform spacing basis and, because allowables have been upon a relative recoverable oil in place basis, free enterprise has been available to all operators, except on Federal lands. The Federal Government has enforced unitization on its lands. But such lands have been developed on a uniformly spaced basis, in nowise different from other producing lands of the State.

Although it cannot be denied that unitization has some advantages in the production of oil, yet the fact that it stifles free enterprise, cuts down employment, thus adding to the relief rolls, outweighs such advantages, which, in the States of New Mexico, are practically nonexistent.

Furthermore, the return to the reservoir of gas from high gas-oil ratio wells has made possible the practice of free enterprise, with an absence of waste in fields which otherwise would lend themselves more favorably to unitized development. In general, we have found independent operators reluctant to join in unit operations, particularly with major producers, whose operating expenses and methods are considered to be high. The commission is glad that it can offer, in the State of New Mexico, to independent operators, the opportunity of free enterprise, with all of the advantages but none of the restrictions of unitization.

It has been the policy of the New Mexico Conservation Commission to allow the oil industry a full opportunity to regulate itself, the commission reserving its action to those cases where self-regulation encroaches upon the waste provisions of the statute, and the rules and regulations of the commission. The Hobbs Pool, a major one in the State, is an example of what can be accomplished when a conservation body encourages the operators to work out their own problems, and gives such operators full cooperation in self-government.

The result has been that from this Hobbs Pool there has been produced 90,000,000 barrels of oil, estimated to be more than half the total recoverable reserves, with so low a reservoir pressure drop that at this time, after 10 years of operation, but 20 wells in the field are pumping; all others are flowing.

The average field gas-oil ratio, after 10 years, is but 1880 cubic feet per barrel, notwithstanding the original gas in solution ratio was twice that of the East Texas Field. This is not a criticism of East Texas Field gas-oil ratios, but the point is made that New Mexico's inherent solution ratios are far greater than those encountered in the average Texas field. The original Hobbs Field bottom hole pressure of 1,550 pounds, has decreased to 1,181, a drop of but 24 percent, while more than 50 percent of the estimated recoverable oil has been produced at this time.

The present conservation act, creating an administrative body, became effective in May 1935. The first meeting of operators to consider curbing high gas-oil ratios was called immediately, on May 8, for the Cooper Field. Since that time, operators meetings to consider reducing high gas-oil ratios have been called many times each year. To be specific, six meetings were held in 1935; four in 1936; one in 1937; five in 1938; four in 1939; and two so far in 1940.

The oil fields in New Mexico are predominantly of a porous lime productive section. The pores often approach the size of caverns, and, on account of such wide discrepancies in size, offer every opportunity for the gas to bypass on its way to the bore hole. Correcting the gas-oil ratios in such a formation is much more difficult than handling problems in sand formations, which predominate in most of the other oil producing States.

The problem of corrective work to reduce gas-oil ratios and water intrusion is, therefore, very difficult. At these various meetings of the operators and engineers, general and specific problems have been discussed, general and specific methods of corrective work have been scrutinized, proposed, and put into operation. Operators of meager financial means have been generally inclined to await the working out of effective methods of corrective work before hazarding huge expenditures on corrective methods of unknown effectiveness and uncertain results. The commission, not being able to guarantee results, or not being able to point to certain relief by the use of specific methods, has not forced those operators to spend their profits when results seemed hazardous. The situation on Federal lands, directly under supervision of the Secretary of the Interior, in regard to high gas-oil ratios. has been no different than on those lands under the supervision of the State, nor have the engineers of the Bureau of Mines, nor those of the United States Geological Survey, been able to point out, or to recommend corrective methods to alleviate the high gas-oil ratio condition which the Secretary has pointed out as a criticism of State control, in his appearance before this body.

The Secretary stated before your committee on November 10, page 521, that 275 wells in New Mexico had gas-oil ratios exceeding 5,000 cubic feet in May 1938 and that the number had increased to 331 by July 1939. What the Secretary failed to state was that during this period the percentage of gas-oil ratio wells located on Federal lands increased, while said ratios on fee and State lands decreased.

During the last 6 months of 1939, ratios in excess of 5,000 feet on Federal lands increased slightly over 22 percent whereas the increase on lands under supervision of the conservation commission was less than 1 percent.

We would like to leave this question with your committee, in view of these facts, should not the New Mexico commission be given conservation jurisdiction over Federal lands within the State if the Secretary's sole object is true conservation? Now the Secretary included such statements in his individual report to your investigating body either through ignorance or misunderstanding of the facts of the whole situation, or with a mind completely closed to conditions insofar as State control is concerned, in his effort to extend his authority. The actual detailed figures supporting the statements I have just made are contained in the detailed section of this report.

In the report of the Energy Resources Committee to the National Resources Committee, published in January 1939, under the chapter headed: "Proposal for petroleum and natural gas conservation" there appears the statement that "Unfortunately regulatory practice in New Mexico has not always been as exemplary as its laws." The Secretary of the Interior, before your committee on November 10, 1939, charged that the Oil Conservation Commission of New Mexico has issued no State-wide order fixing gas-oil ratios within the State, that 40 percent of the wells in New Mexico are operated with gas-oil ratios in excess of 2,000 cubic feet, a State-wide maximum adopted by Texas. Here again the Secretary has acted through ignorance of the full facts in the case, or in overzeal in misstating the earnest efforts of the conservation body of New Mexico to work with the operators, and not against them, to establish what the commission feels to be the quickest route to true conservation. When there is no known solution to the solving of high gas-oil ratio problems in a field, obviously an arbitrary rule will not accomplish such result, but only serve to delay the final solution.

As to the criticism of the Secretary of the failure of the State to lay down an arbitrary gas-oil ratio for the State, I would like to refer your committee to the testimony of Mr. Ben E. Lindsly, of the Bureau, on page 305 of the published report of your present petroleum investigation, published in 1939. After Mr. Lindsly outlines the difficulties in establishing arbitrary gas-oil ratio rules, he sums up with this observation: "The foregoing discussion illustrates the fallacy of attempting to stipulate one gas-oil ratio as a measure of efficiency of production in all fields of a State." Right here I would like to observe to your committee that the testimony and statements of the seasoned engineers of the Bureau, such as H. C. Miller, and Ben E. Lindsly, reflect more rational thinking and intelligence than the reports of other members of the Secretary's departmental personnel, who, by their statements, indicate the theoretical and academic approach to problems which can be solved only through the application of a combination of scientific training and a long period of experience in direct contact with the oil-producing industry.

On page 318, H. C. Miller, above referred to, voices the general opinion of all competent engineers (this excludes theorists and economists with a purely academic approach to practical problems)—

> To specify a gas-oil ratio as being most efficient in one field, and to consider that it, therefore, should be most efficient in another is strictly against all good engineering tenets.

Again, Mr. Soyster's statement, on page 436:

> Many methods in the present-day use are of value in conserving gas and utilizing it efficiently. The effectiveness of the different methods will vary for different fields, and for different wells, depending upon many underground factors seldom, if ever, consistent for any given locality. It is recognized that no single method, or group of methods, can be uniformly applied, but that each well should be studied as an individual problem, and the best method indicated by such study applied.

Following this testimony, the Secretary of the Interior stated, on page 541:

> I do not think the States have done all that they might have done.
>
> Question. I take it from your statement that they had done nothing, and for that reason the Federal Government feels justified in stepping in.
>
> The SECRETARY. Well, I would not say that. They have effected in various States, as my statement showed, oil and gas ratios which seem to vary between States; seem to vary as between fields in the same State; and which do not seem in all instances to be respected by the producers, and, in the statement of Mr. Lindsly, it was shown that in particular instances it was not necessary to waste so much gas in order to produce a barrel of oil.

It would appear, in the face of the evidence of members of his Department, that the Secretary still believes in fixing an arbitrary gas-oil ratio that would not vary between States. Else, why would he feel that the Federal Government is justified in stepping in, because his statement showed that various States have established gas-oil ratios at variance with each other and varying from one field to another in the same State.

With further reference to high gas-oil ratios within the State of New Mexico, and the erroneous statement by the Secretary that 40 percent of the wells in the State have ratios of over 2,000 cubic feet per barrel, there is submitted in the detailed section of this statement, true facts of the individual gas-oil ratios in all fields of the State, which summarized, show that but 29 percent of the wells of the State have a gas-oil ratio exceeding 2,000 cubic feet.

Furthermore, it is also shown that the average gas-oil ratios of all wells within the State does not exceed 2,700 cubic feet per barrel. We feel that this average figure indicates a mark of progress in overcoming exceedingly difficult situations in this State, which are not encountered to any great extent in any other oil producing State. We feel that since this expenditure of hundreds of thousands of dollars in corrective work by the operators of this State has improved control methods the future gas-oil ratios should show further decline. It may be well to point out here, that operators in various instances have expended a greater amount of money on particular wells than the actual money value of the gas which it could hope to save, or the oil which might be left unproduced on account of such remedial work.

We wish to point out further, at this point, that there is no common agreement of engineers and experts as to the quantitative value in recovering oil of the energy contained in gas in a porous lime reservoir, wherein there is an abundance of water energy for production purposes. The commission has taken the attitude of conserving gas in such instances in order to be on the safe side insofar as waste is concerned. It has not, however, seen fit to force an operator to attempt to conserve gas to the point of confiscation of property, where the energy contained in the gas appears to be of doubtful value in the conservation of oil, where an abundance of reservoir energy in other forms exists in the reservoir. In other words, the commission has not attempted to confiscate the property of the present generation in order to save gas for a future generation upon the supposition that the value of such gas at that time will be such that it will warrant renewed development, and investment in transportation facilities to a point of use. It is cognizant of the immense coal reserves estimated by the Secretary's experts to be sufficient to last 2,000 years, and it also recognizes that the future generation for which we may conserve a supply, by denying property rights to our present generation, may find itself in no position to make use of such gas, which at that time may be superseded through the advancement of science.

Referring again to the high gas-oil ratio wells within the State of New Mexico, as criticized by the Secretary and his assistants, we wish to leave this statement, that much of the gas from high ratio wells comes from wells whose oil production is secondary, and in some cases of little consequence on account of its limited supply within the reservoir. The gas from these high ratio wells, in many cases finds a market with the several gas purchasers within the State. This gas finds use for light and fuel, and for the manufacture of gasoline products, and return to the reservoir for pressure maintenance purposes. When the amount of this gas so used is deducted from the grand total, an average of less than 1,000 cubic feet per barrel as a net gas-oil ratio for the State is found, for gas not sold or used for the abovementioned purposes.

Although the commission has not seen fit to establish an arbitrary gas-oil ratio for the State as a whole, it has promulgated rules in various fields where some difficulty has been found in bringing into line that small minority reluctant to do remedial work when the way is shown. The allowable gas-oil ratios of these various fields, in each instance, have been set at a lower figure than that recommended by the operators' committee. But the commission, upon hearing of evidence and finding of fact, is always in position to adjust inequitable ratios.

To further the prevention of waste within the State, experimental operations are now being contemplated, or carried on in three fields, in order to develop the possibilities of pressure maintenance. The commission feels that the operators in New Mexico, under the cooperative relationship existing between the operators and the commission, will be as quick to adopt pressure maintenance measures, when proven, as they have other progressive developments in the past. Viewed as a whole, the New Mexico Conservation Commission feels that its record for true conservation has not been surpassed by any other State. It has been so assured by many of its operators whose holdings cover many States. It has been assured, also, that its helpful cooperation in matters of well spacing, allocation of allowable, etc., has resulted in the saving of many hundreds of thousands of dollars which would have otherwise been expended in unnecessary wells. There is no doubt that much of this money so saved will be reinvested in further exploration of the petroleum reserves of the State.

That the State's recoverable reserves have not suffered through the conservation program, as carried on by the commission, has been proven when new wells have been completed between wells already long producing, with the hope of finding paying production, only to find a water swept, oil stained horizon, from which the oil has already been produced by wider spaced wells. This stand in pacing has brought to the State capital which would have been barred had close spacing and the correspondingly low allowables been practiced.

The administration by the commission of the State's conservation laws has been so satisfactory to its operators that to date there has been no attack in court upon its proration law. The monthly estimate of demand of the Bureau of Mines has been consistently followed in the State's allowable daily production. Within the last 2 years, the daily allowable has been held under such estimates. It has given fullest cooperation to other States in the interstate oil compact, which has gone far to replace the rivalry between States with constructive cooperation. It considers its estimated 800,000,000 barrels of reserves as a trust to be properly conserved, with the recovery properly safeguarded from waste. It believes that this can be done, and is being done, by administering the laws by qualified oil technologists, of long practical experience, who have been able to gain the objective of waste prevention through constructive cooperation, rather than to have created stubborn resistance through autocratic action of theoretical and academic experts such as we had during the days of the N. R. A. code. The State, having administered its conservation laws, in the same fields where the Secretary of the Interior has direct and sole charge of conservation, sees no reason to ask for Federal aid. It desires no Federal assistance, and feels that the operators within its borders are with it in looking forward to a future of a minimum of Government in business.

I think this is all that it is necessary to read from this report, Mr. Chairman.

Mr. Cole. Mr. Andreas, there is a record vote in the House. The bells you have just heard caused two members of the committee to leave.

You want to file the rest of this report?

Mr. Andreas. Yes, sir; I want to file the complete report.

Mr. Cole. Mr. Andreas, I want to ask you just a few questions. Do the representatives of the Federal Government sit in with the commission in New Mexico?

Mr. Andreas. They have appeared.

Mr. Cole. Preliminary to any of your findings which have been more or less of recent origin as to date—I mean by that, most of the activities of the commission seem to be from November 1939, to date.

Mr. Andreas. No, sir; they have attended nearly all of the meetings of the commission held since I have been in the State of New Mexico.

Mr. Cole. They are there as observers?

Mr. Andreas. Yes. We have invited them to sit with us at the bench.

Mr. Cole. Lea County produces what percentage of the total output in your State?

Mr. Andreas. Well, it would be——

Mr. Cole (interposing). Ninety percent?

Mr. Andreas. Yes, I would say so; yes, sir. It might be a little more than that.

Mr. Cole. That field is controlled, so far as the existing law is concerned, by you and who else?

Mr. Andreas. The United States Geological Survey.

Mr. Cole. And your set-up is what?

Mr. Andreas. We have supervision over State and fee lands, not over Federal lands.

Mr. Cole. Are you attempting to exercise any control over Federal lands?

Mr. Andreas. No, sir; we are not.

Mr. Cole. Do you contemplate anything of that kind?

Mr. Andreas. I think that on one or two occasions we have asked them to reduce the high gas-oil ratios on Federal lands and we have been politely told that it was not under our supervision. We have not presumed to remind them since.

Mr. Cole. What was the date of those requests; do you recall?

Mr. Andreas. No, sir; I do not; not offhand.

Mr. Cole. Do you have sufficient knowledge as to the gas-oil ratios in that section to make it a basis of any demand upon the Federal Government?

Mr. Andreas. Will you repeat that again?

Mr. Cole. Did you have sufficient knowledge as to the proper gas-oil ratios in that section to make such the basis of any demand of the Federal Government?

Mr. Andreas. They were offsetting wells to State and fee lands where we reduced our gas-oil ratios within the same field.

Mr. Cole. Prior to December 1939?

Mr. Andreas. Well——

Mr. Cole. Prior to December 1939, just a little while ago, you had not adopted any regulation in the State, although your law had been in effect since 1935, as to proper gas-oil ratios, had you?

Mr. Andreas. We felt that with the cooperation of the operators these gas-oil ratios would be reduced by remedial work. You will note in the detailed section of my report the reduction of gas-oil ratios immediately after the enactment of the conservation law. It was found unnecessary to establish arbitrary gas-oil ratios.

Mr. Cole. Well, if it was unnecessary why, on November 16, 1939, did you issue notice of a public hearing to consider the adoption of regulations governing oil-gas ratios in the various producing fields in New Mexico?

Mr. Andreas. Because there was some criticism in the National Resources Committee report. So we established gas-oil ratios, for various fields. These ratios may be changed.

Mr. Cole. Then that was followed by the appointment of what is known as the Christie committee, was it not?

Mr. Andreas. I think that that committee was appointed last July 1939.

Mr. Cole. December 1939.

Mr. Andreas. There was a committee appointed in July 1939 for the same purpose as the Christie committee.

Mr. Cole. I am talking about the Christie committee. When was it appointed?

Mr. Andreas. I do not recall offhand.

Mr. Cole. Is there someone here from the State who might have that date?

Mr. Staley. The first committee was appointed in July and they made a report to the operators. The committee was asked to make further investigation then they reported to the operators in October, and again they made a further report in November.

Mr. Cole. You are Mr. Staley, are you not?

Mr. Staley. Yes, sir.

Mr. Cole. Is Mr. Staley a member of the committee that serves with you, a member of the State group?

Mr. Andreas. Mr. Staley is deputy commissioner of the oil conservation commission.

Mr. Cole. You are a State employee?

Mr. Andreas. Yes.

Mr. Cole. And so is Mr. Staley?

Mr. Andreas. Yes, sir.

Mr. Staley. Yes, sir.

Mr. Cole. You are paid by the State?

Mr. Andreas. I am; yes, sir.

Mr. Cole. Is Mr. Staley?

Mr. Andreas. Mr. Staley receives, I think, a considerable part of his remuneration from the various oil companies.

Mr. Cole. Mr. Staley is paid by the State, the same as you?

Mr. Andreas. No; the oil conservation department receives their money from one-eighth of 1 percent of the value of the oil produced. Mr. Staley is paid by the operators; but they contribute to the salary of his office on a percentage basis of the oil produced also.

We are both paid by operators, but the money comes through different channels.

Mr. COLE. I do not mean in any way to reflect upon Mr. Staley, but just wanted the record clear as to how the set-up compares with other States.

Mr. ANDREAS. Yes, sir.

Mr. COLE. What is Mr. Staley's official position?

Mr. ANDREAS. He is deputy commissioner.

Mr. COLE. What are his duties?

Mr. ANDREAS. Deputy commissioner; oil and gas inspector; engineer and deputy commissioner of conservation.

Mr. COLE. Is he the individual who determined the gas-oil rates?

Mr. ANDREAS. Not as an individual; the engineers are under his supervision.

Mr. COLE. Well, he is the boss of that division, of those who made the determination; is that the set-up?

Mr. ANDREAS. In determining the gas-oil ratios?

Mr. COLE. Yes. Who determines that?

Mr. ANDREAS. The oil conservation commission, which is composed of the Governor of the State, the land commissioner and myself.

Mr. COLE. I understood you to say a moment ago that Mr. Staley did most of that work.

Mr. ANDREAS. His office is the engineering office. It does the field work.

Mr. COLE. Now, as to the Christie report. Mr. R. S. Christie is chairman of a committee which made the report part of which I have in my hand. That committee was appointed in December 1939. Has that report been filed?

Mr. ANDREAS. No; it has not; but we can get it for you.

Mr. COLE. Will you get it if it has not been filed?

Mr. ANDREAS. Yes.

Mr. COLE. How can you get it if it has not been filed?

Mr. ANDREAS. There was a carbon copy sent into Santa Fe and it was still in Santa Fe when we left.

The legal department of the oil conservation commission made copies for the various operators.

Mr. COLE. What was the purpose of the appointment of the Christie committee?

Mr. ANDREAS. It was composed of engineers of the various companies, to determine the most satisfactory gas-oil ratio to be established at the present time in the various fields in Lea County. However that would be subject to change if we found out that some of the fixed ratios are too high or too low.

Mr. COLE. And Mr. Christie was a petroleum engineer of the Amerada Petroleum Oil Co.——

Mr. ANDREAS. Yes, sir.

Mr. COLE. Do you have the names of the other engineers, the other four appointed with him, making up the five engineers of the committee and the companies by which they were each employed?

Mr. ANDREAS. Yes, sir.

Mr. COLE. Will you name those?

Mr. ANDREAS. R. S. Christie, Amerada Petroleum Corporation; M. Albertson, Shell Co.; L. L. Gray, Gulf Oil Corporation; R. Van A. Mills, Continental Oil Co.; F. E. Heath, Sun Oil Co., and Mr. Glenn Staley, chairman of the engineering committee.

Mr. Cole. Mr. Andreas, I think that the committee will have to suspend at this point in order to give us a chance to vote in the House. We will suspend for 15 minutes. We might be gone a little longer than 15 minutes but we will be back as soon as possible. We are sorry but it cannot be helped.

The committee will take a short recess until we return.

(After a short recess, the committee resumed, as follows:)

Mr. Cole. All right, Mr. Andreas, you may proceed.

I believe I was asking you about the Christie report, was I not, when we recessed?

Mr. Andreas. Yes, sir.

Mr. Cole. Mr. Andreas, I have a few more questions about that. Shall I ask you those questions or wait until Mr. Staley takes the stand?

Mr. Andreas. You might ask Mr. Staley. I think I have told you all I know about it.

Mr. Cole. I have before me some figures dealing with the Lea County fields. That is, fields located in Lea County, which produced approximately 92 percent of the oil output of New Mexico, in 1938 which shows the gas-oil ratio in excess of the figures you gave in your prepared statement. In calling the various fields, I would like, for the purpose of the record, to put this in. You can check this with me as we go along, without taking too much time, and if you will tell me that you cannot do it, I will wait and give you these figures to pass on after you have left the stand.

For instance, the Cooper field, oil production in 1938, 1,682,178; gas production.

Do you have the figures before you showing the oil production and the gas-oil ratios?

Mr. Andreas. I have the daily average figures for those fields.

Mr. Cole. Is that in your exhibit?

Mr. Andreas. Yes, sir.

Mr. Cole. Oh, it is?

Mr. Andreas. Yes, sir.

Mr. Cole. I have the Cooper, Eaves, Eunice, Hobbs. Do you have those?

Mr. Andreas. Yes.

Mr. Cole. The figures I have show a total for 1938 of 37,606,919 barrels and gas production of 166,145,128,000, or 5,080 to 1, gas-oil ratio.

That would be in excess of the figure you gave in your prepared statement, would it not?

Mr. Andreas. Yes; I imagine so.

Mr. Cole. I am wondering if the figures I have are wrong. They are more than double the gas-oil ratio for the same period that you gave in your prepared statement. You say 2,000 cubic feet.

Mr. Andreas. This page I have here is blurred. I cannot read it in my copy.

Mr. Cole. You have the total gas production in cubic feet for 1938 in the large Lea County field.

Mr. Andreas. Yes; I do.

Mr. Cole. What is that? Is it 166,145.128,000?

Mr. Andreas. The total gas for 1938?

Mr. Cole. Yes.

Mr. ANDREAS. No. I have the figures for 1939 in the summary in the back of the report.

Mr. COLE. Are the figures for 1939 available?

Mr. ANDREAS. Yes, sir.

Mr. COLE. I only have the figures for 1938, summary of operations prepared by the engineers' committee, Lea County Operators' Committee. Do you have those?

Mr. ANDREAS. No, sir; I do not have those figures with me. I have them for 1939, oil and gas production by fields.

Mr. COLE. Lea County Operators' Committee; engineers' committee of that group, 1939. Is that summary available?

Mr. ANDREAS. Yes, sir; it is in the report.

Mr. COLE. When did that become available?

Mr. ANDREAS. Well——

Mr. COLE. Within the last few days?

Mr. ANDREAS. Yes, sir; about the 1st of February.

Mr. COLE. You do not have 1938 before you?

Mr. ANDREAS. No, sir; I have 1939.

Mr. COLE. Well, would you have 1938?

Mr. ANDREAS. No, sir; not with me. I have 1939.

Mr. COLE. Well, my figures show for 1938. Then, you can put in 1939 figures in the revision of your remarks and you can make any comment on this you please. These show the total oil production for 1938; 92 percent of the total production of the State in Lea County was 32,706,919 barrels, and the gas production was 166,145,128,000, which means 5,080 to 1.

And then for the same year the marketed production of natural gas, including gas from both gas wells and oil wells, did not exceed 51,000,000,000 cubic feet.

That is according to the Bureau of Mines' statistics, which would leave 100,000,000,000 cubic feet of natural gas wasted in New Mexico during the year 1938.

Have you anything to contradict that?

Mr. ANDREAS. No, sir; except from memory. I do not believe those figures are accurate.

Mr. COLE. How much was wasted in 1939, then?

Mr. ANDREAS. I do not have that total.

Mr. COLE. That is an average of 300,000,000 cubic feet of gas wasted during the year 1938.

Mr. ANDREAS. I do not believe that those figures are accurate. If the committee will give me some time I will submit some figures which will take into consideration the 1939 production.

Mr. COLE. Well, can you show anything from your report here, any difference between the total gas production in 1939 in this Lea County area, production area, and the marketed production, leaving a balance which I assume you will conceive was wasted?

Mr. ANDREAS. I would have to have a day or two to compile those figures. I think I can do it with what I have here in this book, but I cannot give you the total now.

Mr. COLE. You have the summary of the committee for 1939?

Mr. ANDREAS. Yes, sir.

Mr. COLE. And that is what you filed here?

Mr. ANDREAS. Yes, sir.

Mr. COLE. All right.

Mr. ANDREAS. Yes, sir.

Mr. COLE. There should be no difficulty about that.

Mr. ANDREAS. No; there will not be, if you will give me a little time. I can do that.

Mr. COLE. All right.

Total gas production and its commercial uses

	1939	1938
Total gas production	169,016,215,000	166,145,128,000
Amount processed by gas plants (Of this amount the following is used for domestic and commercial purposes in El Paso, Carlsbad, Lordsburg, Phoenix, Tucson, Douglas, Hobbs, Lovington, and other towns in New Mexico, Texas, Arizona, and Mexico: 1939, 45,625,000,000; 1938, 41,975,000,000.)	88,671,389,000	92,500,000,000
Amount used by drilling rigs	8,000,000,000	8,000,000,000
Amount used in gas lift and lease maintenance	10,000,000,000	8,000,000,000
Amount used by towns, camps, etc. (not processed by gas plants)	4,000,000,000	4,000,000,000
Amount blown to air	58,344,826,000	53,645,128,000

Then further, Mr. Andreas, the Bureau of Mines figures show that 97,830,000,000 cubic feet of natural gas were treated at natural-gasoline plants in New Mexico during 1938, producing 49,596,000 gallons of natural gasoline, or an average of 0.507 gallon per thousand cubic feet of gas, which leaves as untreated 68,315,128,000 cubic feet, or 59 percent of the gas production reported for 1938 from the engineers' committee and shown in the above table.

Now, without those figures before you, I, of course, realize that you cannot comment upon the correctness of this; but I will be very glad to have you do so in the revision of your remarks.

The reason I mention this is that it appears to me in contrast with the statement made at the State-wide meeting of the New Mexico Oil Conservation Commission on December 9, 1939, by Chairman Christie, appointed to study this gas-oil problem in Lea County.

Mr. ANDREAS. Those figures you quote, Mr. Chairman, were figures for gas treated in gasoline plants?

Mr. COLE. Yes.

Mr. ANDREAS. There is a large quantity of gas sold for fuel and for domestic uses. The El Paso Natural Gas Co. takes a large percentage of the gas produced in these fields.

Mr. COLE. That would be marketed production?

Mr. ANDREAS. Yes, sir.

Mr. COLE. I am taking that into consideration and you can, too, in your discussion.

Mr. ANDREAS. You were just considering the gas that was treated for gasoline, were you not?

Mr. COLE. Yes. Of course the assumption is that the untreated gas figures I have just given you, untreated gas would yield the same quantity of natural gasoline as that treated 0.507 gallon per thousand cubic feet and the untreated natural gasoline content of the 68,215,000,000 cubic feet would total 38,630,000 gallons. I think you will find when you go over those figures that that is a correct statement.

Mr. ANDREAS. Gas, of course, is used for gas lifting. Import gas should not be considered as waste gas. There is a certain amount of gas contained in the oil as it is produced. Thoeretically there should be a gas solution figure. The oil cannot be produced at that theoretical figure and there is therefore other gas produced along with the oil above this theoretical gas-solution figure, which has cannot be called wasted.

Mr. COLE. Were members of the United States Geological Survey invited to the meeting held on December 9?

Mr. ANDREAS. They were present. I do not know whether they were handed a written invitation or not. We usually notify all operators. I think they were notified too. I am not sure. But, they were present. In fact, some representative is at every one of our meetings.

Mr. COLE. Has the committee's report, that is, the report of the five engineers, been adopted by the operators' committee, if you know?

Mr. ANDREAS. You mean the Christie report?

Mr. COLE. Yes.

Mr. ANDREAS. The Christie report was submitted to the Lea County Operators' Committee and this report was also sent to Santa Fe and the commission acted on the Christie recommendations to the Lea County operators. In so doing we reduced to a lower figure in several fields the recommendations of the Christie committee.

Perhaps you lose sight of the fact that this gas-oil ratio hearing in the latter part of 1939 was not the only gas-oil ratio meeting we have had. I think if you will look on page 521 of your petroleum investigation hearings, you will note a statement that an observer had made the remark: "One of the members of the committee had stated that if the gas-oil ratio remedial work was not done, it would be necessary to have the gas-oil ratio maximum established for each field in New Mexico."

Previous to that time we have held meetings. Immediately after the passage of the conservation act and I think I stated in my report there were six in 1395; four in 1936; one in 1937; four in 1938; and several in 1939, and two in 1940.

Mr. COLE. Mr. Wolverton wants to ask you some questions.

Mr. ANDREAS. May I make another statement?

Mr. COLE. Yes, indeed.

Mr. ANDREAS. In all this time, talking about these gas-oil ratios, the Federal Government have had production in the same fields and they have never established a maximum gas-oil ratio on their own land. We were the ones that took the initiative.

Mr. COLE. All right, sir. Mr. Wolverton.

Mr. WOLVERTON. What do you consider a proper gas-oil ratio?

Mr. ANDREAS. I do not believe anybody could make a definite statement like that, Mr. Wolverton. You cannot establish any definite gas-oil ratio. It would change with the field.

Mr. WOLVERTON. Has the State of Texas fixed a definite gas-oil ratio?

Mr. ANDREAS. Yes; I believe they have.

Mr. WOLVERTON. They seem to have.

Mr. ANDREAS. They have also made exceptions after they established that maximum gas-oil ratio. We could do the same in New Mexico and make exceptions to fit the conditions in the particular area.

Mr. WOLVERTON. I am asking your opinion, because of the fact that Texas has already fixed a gas-oil ratio, why cannot New Mexico do the same thing?

Mr. ANDREAS. We have already done so.

Mr. WOLVERTON. What have you fixed?

Mr. ANDREAS. We have fixed varying ratios for various fields, because conditions are different in each field.

Mr. WOLVERTON. What is it?

Mr. ANDREAS. I beg your pardon.

Mr. WOLVERTON. What is it on the average? I have before me a statement that would indicate in 1938 that in the Cooper field, the gas-oil ratio was 13,527 to 1 and in the Eaves field 14,741 to 1; the Eunice field 5,039 to 1; the Hardy field 6,247 to 1; the Hobbs field 2,281 to 1; and the Jal field 24,731 to 1; Langlie, 5,158 to 1; Mattix, 4,603 to 1; Monument, 3,153 to 1; Penrose, 5,249 to 1; Rhodes, 189,682 to 1; Skelly, 4,010 to 1; South Eunice, 4,780 to 1; and Vacuum 1,101 to 1. They are all, I think, in the Lea field.

Mr. ANDREAS. Yes; they are in Lea County.

Mr. WOLVERTON. And that would show on the basis of the figures of oil produced a gas-oil ratio on the average of 5,080 to 1.

Now, how do you justify any such average gas-oil ratio as that, and with particular reference to the fields with such outstanding gas ratios as 13,000 to 1; 14,000 to 1; 24,000 to 1; 189,000 to 1?

Mr. ANDREAS. Some of that gas, Mr. Wolverton, is in-put gas. It is used for gas lift. It is formational gas plus in-put gas. Therefore the figures were higher.

Now, I have some figures before me here which show where on the average gas-oil ratios on Federal lands in the Maddox field was 4,796 cubic feet per barrel whereas that on State land was 3,005 feet. Skelly field, the average gas-oil ratio, Federal land, was 2,745; State land, 2,697.

In the Jal area on Federal acreage, 10,394; 4,430 on State lands.

Mr. WOLVERTON. I am not seeking to either commend you or criticize you on the basis that your ratio is as good or better, or worse, than it is on the Government-owned land.

Mr. ANDREAS. No, sir.

Mr. WOLVERTON. I am speaking now on the subject of your general gas-oil ratio, no matter who operates the wells, and I am seeking to find out if Texas can fix a gas-oil ratio of 2,000 to 1, why is it that New Mexico, is so liberal as to pass an order that it is not to exceed 10,000 to 1? I think that was the order you made.

Mr. ANDREAS. Yes; we have used that in two fields.

Mr. WOLVERTON. Well, in making those orders you certainly did not intend that anybody should shut down, did you?

Mr. ANDREAS. No; we hope not.

Mr. WOLVERTON. So fixing gas-oil ratio at that time was just camouflage, so far as actual good is concerned, was it not?

Mr. ANDREAS. No, sir.

Mr. WOLVERTON. Why did you fix 10,000 to 1?

Mr. ANDREAS. It was not camouflage, because in some of those fields it would be impossible to produce gas with a 2,000 cubic foot ratio which was established by Texas.

Mr. WOLVERTON. Well, since the issuing of that order has, any step been taken to correct the situation with reference to wells that had a larger gas-oil ratio than 10,000 to 1?

Mr. ANDREAS. Those wells were shut in; yes, sir.

Mr. WOLVERTON. How many?

Mr. ANDREAS. Well, any wells that are over the gas-oil ratio fixed as a maximum must shut in.

Mr. WOLVERTON. I say how many?

Mr. ANDREAS. I do not know. That was effective the 1st of February.

Mr. WOLVERTON. And when you issued this order you had no knowledge as to how many wells it would affect?

Mr. ANDREAS. Not right offhand; I could not tell you right offhand. There will be a number of them; yes, sir.

Mr. WOLVERTON. Do you have any knowledge of the amount of oil produced from the wells that would be shut down under that order?

Mr. ANDREAS. Under that order the wells were allowed to produce that amount of gas; if the maximum gas-oil ratio was 10,000 cubic feet and the allowable for the tract was 40 barrels, that would mean that they would be allowed 4,000,000 cubic feet of gas produced and the oil allowance with it, and as soon as 4,000,000 cubic feet were produced, any well producing it could no longer produce for that day.

Mr. WOLVERTON. I am trying to get some figure as to what the real meaning is from the standpoint of production.

Mr. ANDREAS. I do not believe I can give you all of those right off.

Mr. WOLVERTON. It would seem to me from the answers that you have given that it was not intended that it should be an effectual fixing of a gas-oil ratio; that you felt that you had to fix some kind of a ratio and you fixed 10,000 to 1 so it would not do anybody any harm.

Mr. ANDREAS. No, sir; I do not believe that is true.

Mr. WOLVERTON. Who fixed the 10,000 to 1?

Mr. ANDREAS. The conservation commission.

Mr. WOLVERTON. Who composes that commission?

Mr. ANDREAS. The Governor and the State land commissioner and myself.

Mr. WOLVERTON. Who made the recommendation to you that that be the ratio?

Mr. ANDREAS. The Christie committee through the Lea County operators in their report, the Lea County operators' committee, which was submitted to us and we in turn examined it thoroughly and reduced most of the figures that they recommended to the commission.

Mr. WOLVERTON. Will you explain to me the set-up of the Christie committee. Is that an operators' committee?

Mr. ANDREAS. Yes, sir; they are engineers for the operators.

Mr. WOLVERTON. What did your engineers report to you? What did they recommend? What did they advise?

Mr. ANDREAS. Advised the figures that we finally accepted and issued our order on.

Mr. WOLVERTON. Who made that recommendation to you; were they State employees?

Mr. ANDREAS. I was instrumental in most of it.

Mr. WOLVERTON. Did you make any studies of your own?

Mr. ANDREAS. Yes, sir.

Mr. WOLVERTON. Or did you accept their figures?

Mr. ANDREAS. I did not.

Mr. WOLVERTON. Did you have men under you that did?

Mr. Andreas. Yes, sir.

Mr. Wolverton. How many?

Mr. Andreas. I think about four or five.

Mr. Wolverton. Then if you made a study of it and if your men worked this out, and men working under you conducted the survey, why did you not make a recommendation to the board instead of accepting the operators' committee's report?

Mr. Andreas. We have always worked in cooperation with the operators.

Mr. Wolverton. Have you ever differed from them?

Mr. Andreas. Yes, sir; lots of times.

Mr. Wolverton. You did not differ in this matter, did you?

Mr. Andreas. I think so. If you will examine that paper which I just sent up there to you, I think you will find we did.

Mr. Wolverton. This paper that is before me is entitled "Oil Conservation Commission of the State of New Mexico, case No. 19 or No. 238, order of commission regulating and prescribing maximum gas-oil ratio for the various fields in the State of New Mexico."

Mr. Andreas. Yes, sir.

Mr. Wolverton. Is that the paper you refer to?

Mr. Andreas. Yes, sir. I think if you will look at the back page, at those red figures, where the commission fixed the ratios, that you will find that the commission adopted figures which were a reduction of the figures as submitted by the operators committee.

Mr. Wolverton. What is the date of the paper? I fail to see anything other than the hearing was held on December 9, 1939.

Mr. Andreas. I think the 13th day of January 1940.

Mr. Wolverton. They are the latest figures on the subject, are they?

Mr. Andreas. Yes, sir.

Mr. Wolverton. When did you start to show an interest in the question of gas-oil ratios?

Mr. Andreas. As soon as I was first connected with the Bureau of Mines at Socorro in 1934.

Mr. Wolverton. You evidently did not do anything, because this is the first order, is it not, that you ever issued fixing gas-oil ratios?

Mr. Andreas. My first interest in gas-oil ratios dates back to November 1937, when I was appointed acting State geologist.

Mr. Wolverton. When was the first action taken by the commission?

Mr. Andreas. Well, when we held these——

Mr. Wolverton (interposing): Fixing the gas-oil ratios.

Mr. Andreas. Fixing the gas-oil ratios.

Mr. Wolverton. Such as it is.

Mr. Andreas. Such as it is.

Mr. Wolverton. Yes.

Mr. Andreas. On the 13th day of January 1940.

Mr. Wolverton. Then you have been working on it since 1937 and the commission has had it under consideration from 1934, before they ever got to the point of making an order.

Mr. Andreas. Yes, sir.

Mr. Wolverton. Now, how quickly did it take you to make an order when you shut down last August?

Mr. Andreas. About 24 hours.

Mr. WOLVERTON. Will you explain that situation to me; the speed with which you acted to shut down wells and limit production, and the slow speed by which you finally produced the gas-oil ratio?

Mr. ANDREAS. The reason for that shut-down of the wells was naturally the question of price.

Mr. WOLVERTON. Well now just give me your version of it. How did you get interested in that and when did you get interested? Did you start your inquiries into that in 1937, or was that more immediate? Just give me the whole story as you understand it from your standpoint.

Mr. ANDREAS. The shut-down?

Mr. WOLVERTON. Yes.

Mr. ANDREAS. I attended the meeting in Oklahoma City, I think August 15.

Mr. WOLVERTON. Who told you about that meeting?

Mr. ANDREAS. I was instructed by the land commissioner and the Governor to go over there. He received a telegram.

Mr. WOLVERTON. From whom?

Mr. ANDREAS. I presume from the chairman of the interstate compact commission.

Mr. WOLVERTON. Who was that?

Mr. ANDREAS. Colonel Thompson.

Mr. WOLVERTON. Was he chairman or secretary?

Mr. ANDREAS. He was the chairman.

Mr. WOLVERTON. I was confused. I thought for the moment that Governor Phillips was chairman.

Mr. ANDREAS. He is the new chairman.

Mr. WOLVERTON. I understand that he is now. But he was not at that time.

Mr. ANDREAS. That is right.

Mr. WOLVERTON. Did you see the request that came?

Mr. ANDREAS. No.

Mr. WOLVERTON. From Colonel Thompson.

Mr. ANDREAS. No, sir; I did not.

Mr. WOLVERTON. Were you told what it was?

Mr. ANDREAS. Yes; I was told to go; there was a meeting of the interstate compact commission at Oklahoma City. The Governor was unable to go and he appointed the Lieutenant-Governor, in his place, and asked me to go also.

Mr. WOLVERTON. Was that a special meeting?

Mr. ANDREAS. Yes, sir.

Mr. WOLVERTON. An emergency meeting?

Mr. ANDREAS. Apparently so; yes, sir.

Mr. WOLVERTON. And were you told before you went what the emergency was?

Mr. ANDREAS. No, sir.

Mr. WOLVERTON. Was there any emergency, in your State, at that time?

Mr. ANDREAS. Not at that particular time; no.

Mr. WOLVERTON. Well then where did you find out that an emergency existed?

Mr. ANDREAS. As soon as I attended that meeting in Oklahoma City.

Mr. Wolverton. So, so far as New Mexico is concerned, there was not any emergency?

Mr. Andreas. I wish to correct that statement. The price cut had been posted in New Mexico before I attended that meeting; yes, sir.

Mr. Wolverton. Did that create an emergency?

Mr. Andreas. So far as the State of New Mexico is concerned, it did.

Mr. Wolverton. Had you taken any steps with reference to it?

Mr. Andreas. Yes, sir.

Mr. Wolverton. When had that cut taken place in your State?

Mr. Andreas. I do not know. It was either 24 or 48 hours before I went to the meeting.

Mr. Wolverton. Who made the cut?

Mr. Andreas. One of the major oil companies.

Mr. Wolverton. Which one?

Mr. Andreas. Sinclair.

Mr. Wolverton. How much?

Mr. Andreas. Twenty cents.

Mr. Wolverton. In what way did they cut?

Mr. Andreas. They cut the posted price of crude 20 cents a barrel.

Mr. Wolverton. When you saw that, what did you do?

Mr. Andreas. We had a meeting of the Land Commissioner and the Governor and myself.

Mr. Wolverton. For what purpose?

Mr. Andreas. For the purpose of shutting in the wells.

Mr. Wolverton. Why did you want to shut in the wells?

Mr. Andreas. Because we did not want to produce any oil below the cost of production.

Mr. Wolverton. And you did not. Was it your thought that by shutting in the wells that you would stop this cut in price that the Sinclair had made?

Mr. Andreas. We hoped so.

Mr. Wolverton. In other words, you held a meeting immediately to take steps to offset any reduction in the price of oil.

Mr. Andreas. Yes, sir.

Mr. Wolverton. Did you feel that by shutting off production that that would keep the price from going down?

Mr. Andreas. We hoped that it would.

Mr. Wolverton. Then, limitation of production does have an effect on price, does it not?

Mr. Andreas. Yes; when it is not unreasonable I think that that is the proper thing to do.

Mr. Wolverton. Then you are more interested in stabilizing the industry than you are in this subject from the standpoint of conservation?

Mr. Andreas. We considered when the price cut became effective, that there was overproduction and overproduction constitutes waste.

Mr. Wolverton. Had you any evidence of overproduction?

Mr. Andreas. Yes; with the price cut we assumed that there had been.

Mr. Wolverton. No, no; I did not ask you to assume that just because they cut the price. I asked you if you had any evidence of overproduction.

Mr. Andreas. My deductions were that as soon as the price was cut there was overproduction.

Mr. Wolverton. Did you keep a record of the amount of available oil?

Mr. Andreas. No; we have no storage in New Mexico at all.

Mr. Wolverton. Then where would you find out whether there was overproduction or not?

Mr. Andreas. We decided there was overproduction when the price of crude was cut.

Mr. Wolverton. There might have been overproduction at some place, some wells; but did you find any wells in your state producing what you term a surplus or overproduction?

Mr. Andreas. No, sir.

Mr. Wolverton. Well then it was not a matter for you folks at all then, so far as shutting in your wells was concerned?

Mr. Andreas. Yes; but we found that out when we went to Oklahoma City.

Mr. Wolverton. I am speaking about what you found out before you went. You did not know that there was an emergency existing until you went to Oklahoma City.

Mr. Andreas. We knew that if there was a price cut, New Mexico would not produce any oil below production costs.

Mr. Wolverton. Did you think that the overproduction was such that all wells had to be shut down for a definite period of time?

Mr. Andreas. We hoped by closing all in that the price cut would be restored.

Mr. Wolverton. Did you give any consideration to the question of supply and demand, or was it just on the theory that if there is a cut in price there must be too much oil?

Mr. Andreas. Yes; that is right.

Mr. Wolverton. That is the only basis upon which you did it?

Mr. Andreas. Yes, sir.

Mr. Wolverton. Where does the consumer get off under any such practice as that?

Mr. Andreas. Well——

Mr. Wolverton (continuing). Without any figures before you.

Mr. Andreas. No, sir.

Mr. Wolverton. Just because some company reduced the price you concluded that there must be overproduction and rather than to let the consumer have the benefit of any situation such as that, you immediately shut down all of the wells to artificially keep up the price?

Mr. Andreas. Yes, sir; but you should remember there is the producer who should also be considered.

Mr. Wolverton. Yes; you think they should also be considered.

Mr. Andreas. Yes; he cannot produce oil below cost.

Mr. Wolverton. I agree with you on that; but it seems to me he was not given any consideration here, for you never went into any figures, never went and made any inquiries to determine whether there was too much oil being produced. You just assumed because somebody had changed the price that there was too much oil being produced and therefore you had better shut down all of your wells.

Mr. Andreas. Yes, sir. That has been the policy of the oil-conservation commission since long before the shut-down in August.

Mr. Wolverton. Well, I have been rather suspicious that that might be true. I have often thought that it is more of a desire for stabilization than it is conservation and that much of the talk about conservation is really a cloak to cover an effort to stabilize the industry, and you agree with me on that.

Mr. Andreas. I think you can consider stabilization and conservation the same.

Mr. Wolverton. Evidently from the statements that you have made to the committee and are making now, conservation is of secondary importance and price maintenance of primary importance.

Mr. Andreas. No, sir; the conservation was the primary and principal consideration along with stabilization.

Mr. Wolverton. When this committee was conducting hearings some 5 years ago we heard much talk about the necessity of legislation permitting limitation of production as a conservation measure. During those hearings I brought to the attention of the witnesses every bit of information that I could find with reference to what was the existing oil reserve in this country, whether coal could be utilized, whether shale could be utilized, whether there were any substitutes that could be used, and so forth. I notice in your statement today that you use much of that kind of material to justify the fact that you have not been as severe down there on your producers as some might think you should have been in the interest of conservation.

You say your commission has not

> seen fit to force an operator to attempt to conserve gas to the point of confiscation of property, where the energy contained in the gas appears to be of doubtful value.

and so forth, and

> In other words, the commission has not attempted to confiscate the property of the present generation in order to save gas for a future generation upon the supposition that the value of such gas at that time will be such that it will warrant renewed development, and investment in transportation facilities to a point of use. It is cognizant of the immense coal reserves estimated by the Secretary's experts to be sufficient to last 2,000 years, and it also recognizes that the future generation for which we may conserve a supply, by denying property rights to our present generation, may find itself in no position to make use of such gas, which at that time may be superseded through the advancement of science.

You have collected together all of the arguments I ever heard presented against conservation and you have presented them to the committee here today to justify your position in New Mexico which evidently is that of getting what you can out of the wells so long as you do not cut the price too far.

Mr. Andreas. No; I do not think that is the idea at all.

Mr. Wolverton. Why do you lay emphasis on the question of coal supply for 2,000 years? What were you attempting to prove to the committee when you made that statement today? Is that an argument in favor of conservation or that conservation is not as necessary as some have thought?

Mr. Andreas. We still have conservation in New Mexico regardless of the fact that there are 2,000 years' supply of coal.

Mr. Wolverton. That lessens the necessity of conservation of oil, does it not?

Mr. Andreas. Not necessarily.

Mr. Wolverton. Why did you refer to it then?

Mr. Andreas. We are talking about gas.

Mr. Wolverton. I say then why did you refer to it in your argument? For what purpose are you seeking to impress the committee with its significance?

Mr. ANDREAS. The fact that the commission had been critized in regard to the lack of the rules or maximum gas-oil ratio in the various fields, talking about gas in this particular instance, that the value of the gas in some future time may not be worth as much then as it is now in regard to recovery of oil by gas lift for instance.

Mr. WOLVERTON. Well if I understand the situation, the importance of the proper gas-oil ratio is to get the best possible return from the well.

Mr. ANDREAS. Yes, sir.

Mr. WOLVERTON. And it has been impressed upon us that a proper gas-oil ratio was necessary as a means of conservation of oil.

Mr. ANDREAS. That is right, but it is sometimes necessary to use high ratios to recover oil that otherwise would be lost.

Mr. WOLVERTON. Now, you argue here that it is not necessary to have a gas-oil ratio, because there is coal that will supply us for 2,000 years from which oil can be made.

Am I expected to draw from that thought that you folks down there in New Mexico do not believe in conservation to the extent that some others do.

Mr. ANDREAS. I think our recent maximum gas-oil ratio orders will adapt themselves to particular fields and that is why they are not fixed at one maximum figure for the entire State, because the conditions vary in the various fields.

Mr. WOLVERTON. Let us go back for a moment to this set-up that you have down there.

As I understand, 92 percent of the oil produced in New Mexico is produced from Lea County fields.

Mr. ANDREAS. Yes, sir.

Mr. WOLVERTON. And Lea County has an oil operators' committee that cooperates with your State commission; is that right?

Mr. ANDREAS. That is right; yes, sir.

Mr. WOLVERTON. Who composes that operators' committee?

Mr. ANDREAS. I think all of the producers in Lea County are members of it.

Mr. WOLVERTON. But, who constitutes the committee?

Mr. ANDREAS. They have various committees.

Mr. WOLVERTON. What companies do they represent? Just give us a picture of the situation.

Mr. ANDREAS. About all of the producing companies and individuals in Lea County belong to the Lea County Producers' Committee.

Mr. WOLVERTON. Do they have a committee known as the Christie committee?

Mr. ANDREAS. That is one.

Mr. WOLVERTON. The one which was referred to here as the Christie committee?

Mr. ANDREAS. That is right. That committee was appointed particularly for gas-oil ratio studies.

Mr. WOLVERTON. Who composes that committee?

Mr. ANDREAS. That is, the Christie committee.

Mr. WOLVERTON. Yes.

Mr. ANDREAS. I think I read off the name of the people. If you want me to——

Mr. WOLVERTON. If they are already in the record, I will not ask you to do so again.

Mr. ANDREAS. Yes.

Mr. WOLVERTON. They represent the major oil companies?

Mr. ANDREAS. Yes, sir.

Mr. WOLVERTON. Do you have any proration of production in your State?

Mr. ANDREAS. Yes, sir; indeed we do.

Mr. WOLVERTON. Who fixed it and when?

Mr. ANDREAS. The Bureau of Mines recommends the production for New Mexico.

Mr. WOLVERTON. You mean the total amount?

Mr. ANDREAS. Yes, sir.

Mr. WOLVERTON. Do you prorate it to the individual wells, individual well owners?

Mr. ANDREAS. Yes, sir; to the various fields.

Mr. WOLVERTON. Do you get your figures of possible demand from the Bureau of Mines?

Mr. ANDREAS. That is the figures that they recommend.

Mr. WOLVERTON. Do you use them?

Mr. ANDREAS. Absolutely. We have for the past 2 years.

Mr. WOLVERTON. When did they give you the last figures preceding August 15 as to what should be considered the possible supply and demand? Did you follow them when you shut down your wells?

Mr. ANDREAS. No, we did not when we shut the wells in.

Mr. WOLVERTON. That is the point that I am trying to get at. Your action on August 15 was entirely foreign to what had been your custom in the past in following the recommendations of the Bureau of Mines as to demand.

Mr. ANDREAS. That is right.

Mr. WOLVERTON. What caused you to lose confidence so quickly in the Bureau of Mines' figures after having followed them over such a long period?

Mr. ANDREAS. There is a reason for the shut-down, which was the cut in price of crude.

Mr. WOLVERTON. Well, you have knowledge of the fact that the Bureau of Mines has sought over the period of years to balance supply with demand, have you not?

Mr. ANDREAS. Yes, sir.

Mr. WOLVERTON. And you have seen fit during that time, with other States, to take their figures as fairly accurate estimates of demand.

Mr. ANDREAS. Yes, I think they are very close, very close to being accurate.

Mr. WOLVERTON. And you have seen fit to follow them in their judgment for a period of years.

Mr. ANDREAS. Yes.

Mr. WOLVERTON. Then all of a sudden you lose confidence in their estimate of consumer demand and come to the conclusion that they are all wrong and so far wrong that you thought it necessary to shut down all wells.

Mr. ANDREAS. No, we did not have that in mind. We had the question of price, which indicated an oversupply.

Mr. WOLVERTON. Did you consult with the Bureau of Mines before you shut off production to see whether there was too much oil and that their estimates were therefore wrong?

Mr. ANDREAS. No, sir; the price indicated their figures were too high.

Mr. WOLVERTON. Well, after the confidence you have had in them for several years, without any thought——

Mr. ANDREAS (interposing). I think the result of the shut down showed that there was sufficient oil in storage to take care of the immediate needs for that period.

Mr. WOLVERTON. You are aware of the fact that Secretary Ickes stated before this committee in answer to questions that I put to him that when this shut-down was brought to his attention that he had in mind going to the President to take advantage of the provision in the Conally Hot Oil Act withdrawing the privilege of tha tact because he thought that the shut-down was an improper thing to do from the standpoint of the consumer?

Evidently the Bureau of Mines did not agree with you and you did not seek to find out what the Bureau thought about it before you took action to shut down wells.

Mr. ANDREAS. No, sir. We did not consider it necesaary.

Mr. WOLVERTON. Well, I think your answers are perfectly plain that you did it for no other reason than to save the price of oil.

Mr. ANDREAS. That is right.

Mr. WOLVERTON. From an oil producer's standpoint you may find reason to justify that. I am trying to get at the reason that was at the bottom of this shut-down.

I have before me, as I read into the record yesterday, the action that was taken by the different States, and it was all in such close proximity, one order on or about August 15, another on the 16th, as to indicate to me that there must have been united action and I have been trying to find out who brought that action about. You left New Mexico without any knowledge of an emergency until you got to Oklahoma City, when it was presented to you as an emergency.

Now, who brought to your attention the fact that it was an emergency and that something would have to be done?

Mr. ANDREAS. I think that I have already stated that before I went to Oklahoma City, the price of New Mexico crude had been cut 20 cents a barrel and I have already stated that the policy of the Oil Conservation Commission in New Mexico is not to allow the sale of oil below production cost. That was the policy of the commission before I ever became a member ot it.

Mr. WOLVERTON. When you got to Oklahoma City what happened?

Mr. ANDREAS. When I got to Oklahoma City naturally these price cuts and their effect upon conditions of the stripper wells were discussed among several of the members there.

Mr. WOLVERTON. Who attended the meetings?

Mr. ANDREAS. I beg your pardon.

Mr. WOLVERTON. Who attended the meeting?

Mr. ANDREAS. I think representatives of several of the States were there.

Mr. WOLVERTON. Who presented the emergency to you?

Mr. ANDREAS. I think the Chairman of the Interstate Compact mentioned it.

Mr. WOLVERTON. That was Colonel Thompson?

Mr. ANDREAS. Yes, sir.

Mr. WOLVERTON. What did he say?

Mr. ANDREAS. I do not recall right now, but naturally the question of price was discussed.

Mr. WOLVERTON. Do you remember who told you there was an emergency?

Mr. ANDREAS. No, sir.

Mr. WOLVERTON. Did the person who called it to your attention do anything more than call to your attention that there had been a price cut and that that was an emergency, or, that there was an emergency in that too much oil was being produced?

Mr. ANDREAS. So far as New Mexico was concerned, when the posted price was cut below production cost, we considered that an emergency.

Mr. WOLVERTON. Did Colonel Thompson in presenting it to you present that as the emergency?

Mr. ANDREAS. He stated a few facts, that I do not recall right off hand; but New Mexico took independent action, regardless of what was said up there.

Mr. WOLVERTON. Yes; I am aware of the fact that after you all went back home you took action in your own States.

Mr. ANDREAS. Yes, sir.

Mr. WOLVERTON. There is no doubt about that; but what I am trying to get at is what was the emergency that he presented to you? Was it that there was a drop in price, or was it that too much oil was being produced?

Mr. ANDREAS. Naturally the drop in price was an indication of overproduction.

Mr. WOLEVRTON. So that he presented the same thought that you had in the matter?

Mr. ANDREAS. Yes. I do not believe you could draw any other conclusion.

Mr. WOLVERTON. Was there any action taken?

Mr. ANDREAS. Where?

Mr. WOLVERTON. At Oklahoma City?

Mr. ANDREAS. No, sir; not that I know of.

Mr. WOLVERTON. What did you decide to do after having traveled that far?

Mr. ANDREAS. I did not make any decision until I got back to New Mexico.

Mr. WOLVERTON. Was any decision arrived at by those who were attending the meeting?

Mr. ANDREAS. No, sir.

Mr. WOLVERTON. Was there any difference of opinion among those who were present, or were you all of the same mind?

Mr. ANDREAS. I think most of them agreed that a cut in price of crude was an indication of overproduction.

Mr. WOLVERTON. Then you did agree on something? You agreed that the cut in price——

Mr. ANDREAS. Well——

Mr. WOLVERTON (continuing). Was an indication that there was too much oil.

Mr. ANDREAS. I believe that would be so; yes.

Mr. WOLVERTON. And with that agreement among you, was it discussed sa to what means should be taken to relieve the situation?

Mr. ANDREAS. There was no agreement made among anybody.

Mr. WOLVERTON. I do not think you mean that an agreement was reached in the sense that you all entered into an agreement. You said you all agreed. I assumed from that you mean you were all of one mind.

Mr. ANDREAS. In regard to overproduction.

Mr. WOLVERTON. That a cut in price meant that there was too much oil.

Mr. ANDREAS. That is right.

Mr. WOLVERTON. And it was not necessary to make any minutes of it because there was no difference of opinion, is that right?

Mr. ANDREAS. Well, I should say so; yes.

Mr. WOLVERTON. What else did you agree on, while you were there? Was it agreed that it was the duty of each State to go back home and immediately put into effect some limitation of production or cut off production entirely?

Mr. ANDREAS. No sir; there was no agreement of any kind.

Mr. WOLVERTON. Did you discuss what remedy should be pursued to correct the situation?

Mr. ANDREAS. That was to be left to the regulatory bodies of each individual State who had representatives there at the meeting.

Mr. WOLVERTON. Do you mean to say that nobody expressed the opinion that there should be a shut-down?

Mr. ANDREAS. We could not do it as to New Mexico; New Mexico could not make any decision until a majority of the commission were present.

Mr. WOLVERTON. I understand that; but I am speaking now as to whether any policy was recommended at that meeting, namely, that there should be a shut-down for a certain length of time or any other policy?

Mr. ANDREAS. I do not remember.

Mr. WOLVERTON. Well, if you do not remember, I guess that is the quickest way of stopping me from asking questions.

Mr. ANDREAS. I hope so.

Mr. WOLVERTON. I notice that it is always effective when a witness says, "I do not remember."

Mr. ANDREAS. I think, Mr. Wolverton, I have given you very definite answers to most of your questions; those that I could answer.

Mr. WOLVERTON. I think, generally speaking, you have. You have been more frank than the average witness has been. You have admitted that your whole concern was the question of price.

Mr. ANDREAS. Yes, sir.

Mr. WOLVERTON. And you stopped production because you thought the reduction in price meant waste; too much oil.

Some of these commissions, judging by the orders that they issued, if they had the same thought as you had, they expressed it in a different way; but I am inclined to think that you have stated the correct situation and I commend you for your frankness.

Mr. ANDREAS. Thank you.

Mr. WOLVERTON. When you went back to New Mexico I assume you made a report to your commission?

Mr. ANDREAS. Yes, sir.

Mr. WOLVERTON. What did you report to the commission?

Mr. ANDREAS. I reported to them that apparently the cut in the price of crude was an indication of overproduction beyond the reasonable market demands, and consulted our attorney, and our attorney in New Mexico recited the law to me, wherein it was shown we had nothing else to do but shut in.

Mr. Wolverton. Had nothing else to do but that?

Mr. Andreas. That is right.

Mr. Wolverton. Well, I would like very much to have a copy of that opinion if it is available.

Mr. Andreas. I have the law here.

Mr. Wolverton. I would like to see it. How long did you shut them?

Mr. Andreas. Fifteen days.

Mr. Wolverton. Well, the section of this law which you have presented to me, which I assume was the basis of the attorney's opinion reads as follows:

> Sec. 9. The commission is hereby empowered, and it is its duty, to prevent the waste prohibited by this act. To that end, the commission is empowered to make and enforce rules, regulations, and orders, and to do whatever may be reasonably necessary to carry out the purposes of this act, whether or not indicated or specified in any section hereof.

That refers to waste. That does not say anything about a drop in price.

Mr. Andreas. Will you turn to page 4, section C?

Mr. Wolverton. Yes. I will read it if you wish it for the record. It reads:

> (c) The production of crude petroleum oil in this State in excess of the reasonable market demand for such crude petroleum oil. Such excess production causes or results in waste which is prohibited by this act. The words "reasonable market demand," as used herein, shall be construed to mean the demand for such crude petroleum oil for reasonable current requirements for current consumption and use within or outside the State, together with the demand for such amounts as are reasonably necessary for building up or maintaining reasonable storage reserves of crude petroleum oil or the products thereof, or both such crude petroleum oil and products.

In other words, that section indicates a policy of balancing supply with demand.

You have testified that you took your figures on the question of demand from the Bureau of Mines and that you have followed that for years and that in this case you cut it because there was a reduction in price, but without any figures before you as to possible demand or whether there was too much oil.

Mr. Andreas. That is right.

Mr. Cole. Gentlemen, there is another quorum call on the floor. By the time we return it will be almost 5 o'clock.

Colonel Thompson, could you stay over until Tuesday?

Colonel Thompson. Yes, sir; as long as the committee is willing to work at this we are. We are like the boy who was sentenced to be hanged in July and said, "Judge, you don't mean this coming July" [laughter]. We are at the committee's pleasure.

Mr. Cole. I do not get the analogy at all. [Laughter.]

Mr. Wolverton. I never saw a man who was going to be hanged who apparently relished it as you apparently do.

Colonel Thompson. We feel that we are among friends, Mr. Wolverton.

Mr. Cole. We will adjourn until 10 o'clock tomorrow morning, at which time we will finish hearing the gentlemen from New Mexico and then we will hear the gentlemen from Oklahoma. I understand that Montana has released one of their witnesses. It does not appear, Colonel, as though we will reach you until early next week.

Colonel THOMPSON. That is perfectly agreeable. We have a big law suit in Austin on Monday. It is the *Humble Company* v. *the State of Texas*. But, I see that some of the Humble's lawyers are here. It might be if we can get them to stay here we can put the case off.

Mr. WOLVERTON. You say that that is in Austin?

Colonel THOMPSON. In the Federal court, the *Humble Company* v. *the Commission*.

Mr. COLE. It will be necessary for us to take a recess until tomorrow morning, but at this point in the record I want to file a letter from the Secretary of the Interior in which he says:

> In my appearance before your petroleum subcommittee on November 10, 1939, in support of H. R. 7372, I stated that I had asked the Directors of the Geological Survey and the Bureau of Mines to supplement my statement with full reports on present and recent instances of avoidable waste in oil and gas production.

These reports are filed at this point in the record.

(The letter above referred to, together with the reports are as follows:)

THE SECRETARY OF THE INTERIOR,
Washington, February 8, 1940.

HON. WILLIAM P. COLE, JR.,
Chairman, Petroleum Subcommittee,
Committee on Interstate and Foreign Commerce,
House of Representatives.

MY DEAR MR. COLE: In my appearance before your petroleum subcommittee on November 10, 1939, in support of H. R. 7372, I stated that I had asked the Directors of the Geological Survey and the Bureau of Mines to supplement my statement with full reports on present and recent instances of avoidable waste in oil and gas production. Their reports have been completed and, supplemented bv a statement from the Petroleum Conservation Division, are submitted herewith in duplicte.

The report of the Geological Survey is limited to instances of waste in which public or Indian lands are involved directly or indirectly. This report also cites instances in which the public interest in oil operations on public or Indian lands has been affected harmfully by wasteful practices on adjoining nonpublic lands. The report of the Bureau of Mines cites instances of waste in fields or areas which for the most part do not contain public lands. The report of the Petroleum Conservation Division presents some factual data as to natural gas wastage in Louisiana, Texas, and New Mexico. In the aggregate, the reports refer to wasteful practices which have been noted in oil and gas production in California, Montana, Wyoming, New Mexico, Texas, Oklahoma, Kansas, Illinois, Arkansas, and Louisiana.

Of necessity these reports contain merely examples of recent or present wasteful practices and do not represent a complete statement of all existing instances of such practices. Some of the cited examples are those which were of common knowledge in the areas described; others came to the attention of our employees in the performance of their regular duties; and some of the information was obtained by special inquiry. The agencies of the Department of the Interior lack the legal authority, appropriations, and personnel necessary for a comprehensive investigation and study of wasteful practices in oil and gas production.

If H. R. 7372 is enacted the work of the Department of the Interior on oil could be pointed more directly to the investigation of wasteful methods and practices. Likewise, the oil research of the Department could be directed more extensively to the development and application of oil-producing methods and practices which would promote greater ultimate recoveries of oil, through the prolongation of the flowing life of the flush oil fields and the retention in production of stripper-well areas which otherwise may be abandoned prematurely.

If you or the members of your subcommittee have any questions which you wish to ask as to the reports submitted herewith, I will gladly supply such additional information as may be available.

Sincerely yours,

Harold L. Ickes,
Secretary of the Interior.

Present and Recent Instances of Avoidable Waste in Oil and Gas Production

Prepared by Geological Survey, Department of the Interior

MEMORANDUM ON EXAMPLES OF WASTE AS DEFINED BY H. R. 7372

In supervising oil and gas operations on public and Indian lands, methods and practices of operation are subject to frequent inspection and observation by competent petroleum and natural gas engineers of the Geological Survey.

In my testimony on November 8, 1939, before the Petroleum Subcommittee of the Interstate and Foreign Commerce Committee of the House of Representatives, I stated that field engineers of the Geological Survey had considered methods and practices of operation in 275 fields located in 7 States—California, Colorado, Louisiana, Montana, New Mexico, Oklahoma, and Wyoming—in which there are located productive leases on public and Indian lands under supervision of the Geological Survey and that, of this number, 51 fields, or 19 percent, were reported by the engineers as having one or more leasse operated in a manner such as to result in some form of waste as defined by H. R. 7372.

The attached tabulation, figure 1, is a summarization of the data submitted by the field engineers which shows the fields by States and indicates, under the three main headings, the type of waste which is either believed or known to exist. It is further indicated on the tabulation whether such unsatisfactory practices or methods of operation which result in waste are chargeable to a single operator in the field or fields so reported or whether such waste is the result of practices or methods of operation by operators generally in such fields. Under the heading "Physical waste of natural gas by blowing to the air" the estimated volume of gas wasted is shown. It will be noted on the tabulation that in New Mexico a large volume of gas is blown to the air without the extraction of such natural gasoline as it may contain. At the time of compiling the data, several months ago, in the Eunice field in New Mexico, 45 million cubic feet of gas was blown after the extraction of the natural gasoline and 15 million cubic feet was blown to the air without the extraction of the natural gasoline, or a total volume of gas blown to the air of 60 million cubic feet per day.

The following are a few examples of operations resulting in waste of one form or another, as indicated. It should be thoroughly understood that the following are only representative examples of waste and do not constitute the sum total of all such cases of wasteful practices and methods which result in waste. The examples given are merely detailed for the purpose of explaining some of the types of operations which result in various forms of waste.

CALIFORNIA

Kettleman Hills North Dome.—The Kettleman Hills North Dome field has been reported as having prevalent methods and practices of operation which result in waste.

Figure 2, a tabulation entitled "Comparison of high gas-oil ratio production, Temblor zones" shows that certain wells in the Temblor zones in the North Dome of Kettleman Hills oil and gas field have produced, up to August 1, 1939, about 54 percent of the total gas production from the field, and at least one-half of the so-called "white oil" production from these wells would actually be classified as gas condensate under more recent terminology. In view of this and the fact that there was a considerable number of low ratio locations and considerable unused low-ratio potential available, it can be logically concluded that the same volume of oil could have been produced at a much lower gas-oil ratio, possibly as low as 3,000 cubic feet per barrel.

A report written in 1937, by petroleum engineers employed by the Kettleman North Dome Association stated that the decline in pressure caused by excess gas production was seriously affecting the potential production and had reached a point where it was highly desirable to formulate a production plan by which the rate of the pressure decline could be arrested and the pressures in Temblor zones equalized. Several plans to accomplish this conservation of gas energy were suggested. It was shown in this report that the gas-oil ratio could be reduced approximately one-third. The excess gas production over a period of several years produced with a gas-oil ratio one-third higher than necessary provided approximately the volume of surplus gas which was marketed at unreasonably low prices. On account of the revenue derived from natural gasoline, operators in this field have at times produced the maximum volume of gas which could be disposed of at any price without blowing gas to the air. In all of the Temblor zones, except zone No. 1, production of wells at any gas-oil ratio above the minimum for each individual well constitutes a loss of reservoir energy upon which a monetary value can be placed. Over 90 percent of the gas in the Temblor zones will eventually be produced and the efficiency with which this reservoir energy is utilized, as evidenced by the gas-oil ratio, determines to a large extent the volume of oil which will be recovered. The gas-oil ratio for K.N.D.A's Temblor wells in zones 2, 3, 4, 5, and 6 is approximately 2,600. On this basis each thousand cubic feet of gas produces approximately 56 cents worth of oil at the present price of crude. If this oil can be produced with one-third less gas, then each thousand cubic feet of gas will produce approximately 85 cents worth of oil at the present price of crude.

Approximately one-third of the gas produced at present by K. N. D. A. is from the high pressure Eocene zone with a gas-oil ratio of approximately 25,000 cubic feet of gas per barrel of oil. This gas is produced directly into the gas-lift system and used to lift oil from the Temblor zones to the surface. In this manner the operator effects a saving of approximately 3 cents per thousand cubic feet in compression costs; that is, the cost of compressing gas to lift oil from the Temblor zone is approximately 3 cents per thousand cubic feet. As the Eocene development is relatively recent, insufficient data are now available to evaluate the reservoir energy of the gas in that zone.

Premature release of natural gas from solution in crude oil

The map showing the subsurface pressure contours as of January 1, 1939 (figure 3), shows a wide variation of pressures throughout the Kettleman Hills North Dome field, the maximum being approximately 2,800 pounds and the minimum approximately 400 pounds. At these maximum and minimum pressures, the gas in solution in the crude oil will approxiamte 750 cubic feet per barrel and 150 cubic feet per barrel, respectively. From experiments made and reported on, it can be logically assumed that the severe reduction of pressures in certain areas has prematurely released gas from solution in the crude oil in those areas, with a resultant loss of reservoir energy and increase in the viscosity of the crude oil, thereby increasing its resistance to move to the productive wells in the area. Such improper practices in the production of oil, in all probability, reduce the oil recoverable by present methods of production and increase the production cost per barrel of oil produced.

The pressure contour map of the Temblor illustrates the resulting conditions when all operators produce on an individual basis and not on a ratable withdrawal basis.

In this field at the present time 6 wells have been drilled into the Eocene zone. The gas-oil ratios vary from 4,000 cubic feet per barrel to 44,000 cubic feet per barrel of oil. The majority of this gas is produced at a very high pressure and this energy is, as stated before, utilized for gas-lifting oil from wells completed and producing from the Temblor zones. By utilizing the gas energy derived from the Eocene zone, it is put to some beneficial use. However, the removal of such large volumes of gas from these 6 wells will undoubtedly create pressure sinks which may duplicate the undesirable drainage conditions prevailing in the Temblor zones.

The occurrence of waste is believed to result basically from the diversity of ownership and the differences in opinions of the various operators as to proper methods of operating the field and the ever-present desire of each operator to recover all of the oil possible before the adjoining or adjacent operator recovers it; in other words, the rule or law of capture still prevails. Available records and the evidence recorded therein rather clearly indicate that the waste in this field results primarily from the action of certain operators of fee-owned lands, some of which operators, although signatories to the Kettleman Hills North Dome unit agreement as to leases on public domain lands, are not signatories to any agreement as to their leases on private lands that provides for any cooperation in the development or production of such leases or for any regulation by the Department of the Interior or any other governmental agency.

The Kettleman North Dome Association, operator of the leases on Government lands committed to the agreement, has been forced to resort to the concentration of development on certain Government lands and to produce a certain amount of high gas-oil ratio production in an effort to protect Government land from drainage as well as to protect their own interests.

LOUISIANA

Rodessa.—The most outstanding example of waste or dissipation of reservoir energy in a field embracing lands under jurisdiction of the Geological Survey is that which has recently occurred and still is occurring to a lesser extent in the Rodessa oil and gas field which is located partly in Arkansas, Louisiana, and Texas. Several tracts of public land in the Louisiana portion of the field have been seriously affected and damaged by the waste of gas energy. The most serious waste occurred during the development of production in the part of this field lying in the State of Arkansas.

A great deal of waste has resulted from excessive gas-oil ratios and premature release of natural gas from solution in the crude oil resulting from an excessive decline in the reservoir pressures as determined by bottom-hole pressures taken from time to time and, also from the excessive number of wells drilled.

The original reservoir pressure in the Louisiana portion of this field in 1935 is reported at 2,680 pounds per square inch at minus 5,750 feet, and in the Arkansas portion in 1937, at 2,600 pounds per square inch at minus 5,740 feet. The bottom-hole pressure as recorded in wells on a tract of public land, unit No. 5, when first drilled in April 1938, was 1,635 pounds, and on another parcel of public land, unit No. 6 of the same lease when drilled in February 1938, was found to be 1,645 pounds. These 2 units were sold at public auction on September 3, 1937, for a bonus of $107,050.75 and $40,948.75, respectively. At the time of the sale conservative estimates of the expected recovery from these tracts ranged from 6 to 8 thousand barrels of oil per acre. As of December 1, 1939, the recorded bottom-hole pressures had decreased to 100 pounds in wells on unit No. 5 and 270 pounds in the well on unit No. 6. Unit No. 5 had produced to that date, from 5 wells, a total of 122,700 barrels of oil, or about 890 barrels per acre. Unit No. 6 had produced 26,600 barrels of oil from one well, or about 666 barrels per acre, and the well is now exhausted and abandoned as to further oil production. No action could be taken by the Geological Survey to protect these Government lands from damage caused by wasteful practices in the area of the field where they are located. Mathematical calculations show that bottom-hole pressures decreased 1 pound for 16 to 19 barrels of oil produced from each of the 6 wells drilled on these two tracts. The extreme reduction in recovery to only 10 to 15 percent of that originally anticipated can only be explained as due principally to the utter disregard of equities and resources and the waste of reservoir energy during early stages of development in the general area of the productive Gloyd horizon underlying tracts of public land herein referred to. Gas withdrawals and wastage eventually were greatly reduced when the Louisiana Department of Conservation finally on January 1, 1937, placed well allowables on a 50-percent acreage and a 50-percent bottom-hole pressure basis, with a gas limit factor of 2,000 cubic feet of gas per barrel of oil.

The following quotations from various trade journals are informative and refer specifically to the Rodessa field. They are cited to show additional details of the wanton dissipation of reservoir energy in this field.

According to Alec M. Crowell in an article in the Oil and Gas Journal, September 29, 1938, page 106:

"The rates of flow were too high and nonratable and the wells spaced too densely;" and "The vast quantities of gas which were and are now being vented to the air, legally because it is incidental gas, properly returned to the oil productive horizon, would increase the oil recovery appreciably."

Mitchell Tucker, Oil and Gas Journal, February 18, 1937, page 27:

"While the allowables for that field were upon a per-well basis, the daily gas wastage at Rodessa was estimated above 600,000,000 cubic feet, or half the daily domestic consumption of the United States."

Mitchell Tucker in the Oil and Gas Journal of July 8, 1937, page 49, also stated:

"The use of the gas limit factor in the actual allocation of per-well allowables has been applied first in this field by both Louisiana and Texas. It does not actually cause a reduction in the ratio of gas to oil itself, but does create a strong inducement to operators to take immediate remedial or initial preventive steps to ensure a ratio of not greater than 2,000 to 1."

Other published articles pertaining to these phases of development of the Rodessa field are those by Brad Mills, the Oil Weekly, September 27, 1937, page 38; and by George Webber, the Oil and Gas Journal, January 6, 1938, page 30, and June 15, 1939, page 46.

MONTANA

Cut Bank.—The State inspector reports that a lessee on lands in the northern part of this field holds no back pressure on his wells and as a result on this private land lease there is considerable waste of gas which can be heard blowing to the air for some distance from the wells.

On another lease in the Cut Bank field, an operator is blowing to the air approximately 600,000 cubic feet of gas per day. There are 12 pumping wells on the lease which produce approximately 12 barrels of oil per well per day and 50,000 cubic feet of gas per well per day. The gas-oil ratio approximates 4,166 cubic feet of gas per barrel of oil. Reservoir energy is rapidly being dissipated and it is reasonable to assume that, as a result of such practice, the ultimate recovery will be materially reduced, but the operator insists that only by blowing the gas is he able to recover the oil. However, on restricted tribal Indian leases similar conditions have existed but were promptly corrected upon the request or instructions of Geological Survey engineers supervising the operations.

NEW MEXICO

The estimated volume of gas blown to the air, either before or after the extraction of natural gasoline, is shown on figure 1 for the fields in which such waste occurs.

As to the estimated natural gasoline content of the gas wasted, no quantitative tests of gasoline content are available for gas produced in Eddy County, but may be estimated to be about 1 gallon per thousand cubic feet of gas. None of the gas produced from wells in Eddy County is processed for gasoline extraction. The estimated volume of gas blown to the air without extraction of gasoline in Eddy County is 6,475,000 cubic feet per day. Therefore, 6,475 gallons of natural gasoline per day which might be saved is lost forever.

In Lea County, the volume of gas blown to the air without extraction of natural or casing-head gasoline is approximately equal to the quantity of gas processed for natural gasoline and subsequently blown to the air. The estimated gas wastage of each is 97 million cubic feet, or a total gas waste in Lea County of approximately 194 million cubic feet of gas per day.

The gasoline content of gas produced from wells in Lea County fields varies greatly, as shown by the average extraction plant recoveries in 1938 in the following representative fields:

Eunice	0.465 gallons per thousand cubic feet of gas.
Hobbs	2.03 gallons per thousand cubic feet of gas.
Monument	.613 gallons per thousand cubic feet of gas.
Penrose-Hardy	.526 gallons per thousand cubic feet of gas.
Skelly-Sims	.526 gallons per thousand cubic feet of gas.
Rhodes, Jal, and Eaves [1]	.278 gallons per thousand cubic feet of gas.

[1] All gas from all connections, whether gas wells or oil wells, is processed for gasoline extraction and all gas is marketed by the processor.

Waste or dissipation of reservoir energy

Cooper-Lynn.—The average gas-oil ratio in this field is 11,000 to 1, and the ratio for individual wells varies from a minimum of 675 to 1 to a maximum of 100,000 to 1.

Eunice.—The estimated average gas-oil ratio in this field is 4,800 to 1 and the ratios vary from 400 to 1 to 66,000 to 1.

There has been an effort made in New Mexico to reduce the large volume of gas waste. It has been reported that action has been taken recently by the State of New Mexico to establish a maximum allowable gas-oil ratio which may be effective in reducing the present avoidable waste.

In many of the oil fields the casing-head gas produced with the oil is sour gas, considerable volume of which is processed and the resulting sweet gas marketed. This processing costs from about one-half to 1 cent per thousand cubic feet.

So long as the State authorizes producing the present volume of oil it may be difficult to materially reduce the volume of gas being blown to the air, but where it is commercially feasible to do so the excess gas could be compressed and returned to the productive oil horizons. However, in southeastern New Mexico some of the productive formations are cavernous limes and coral reefs and in these the value of repressuring from the standpoint of oil recovery is problematical. Maintenance of reservoir energy by the injection of gas and through the producton of oil with a lower gas-oil ratio may result in lower lifting costs; also, gas would be stored for future withdrawal and consumption.

In the Langlie area, cooperative efforts are being made by oil operators and a large gas-purchasing company to return gas to the productive formations for the purpose of preventing the waste of gas and for such other valuable purposes as may result therefrom. This cooperative effort is an experimental project and if the results are satisfactory it is probable that other similar projects will be initiated.

OKLAHOMA

Underground loss or dissipation of crude oil due to improper casing programs, exposing an excess amount of open hole or gas zone

Jesse.—Examples of practices which result in great subsurface waste of reservoir energy and the dissipation of otherwise commercial deposits of oil is the practice of some operators in the Jesse field. In one case a well located in section 12 was completed with 700 feet of open hole below the casing shoe. The method of setting casing has not varied a great deal in the last 5 years in this area insofar as its relation to the actual producing horizon is concerned, although more recently some of the operators have become more enlightened and are now setting the casing through the productive zone and perforating opposite the desired formation or formations. This practice is entirely satisfactory, provided, of course, that a satisfactory water shut-off has been obtained prior to running and perforating the oil string.

In November 1935 a lessee completed a well on a lease under jurisdiction of the Geological Survey for an initial oil production of 2,831 barrels in 5½ hours. The production string of 9-inch casing was set and cemented at a depth of 3,920 feet in the upper part of the Viola lime. It was reported that 20,000,000 cubic feet daily of dry gas was found between 3,920 feet where the 9-inch casing was set and the top of a sand at 4,621 feet, with no oil showing at the latter depth. From 4,621 feet of 4,633 feet large oil production was obtained. As of March 28, 1936. the well was deepened 60 feet further into the McLish, or Wilcox, sand to a depth of 4,693 feet without running any additional casing. Production was increased to 1,077 barrels per hour. Since completion in November 1935 the well has been flowing under back pressure with all sands from 3,920 to 4,693 feet open to pressure equalization in the well. Some 10 other wells adjacent thereto have been drilled and completed in more or less the same manner and are being produced in a similar fashion. It is possible that oil in the lower zone is being forced into the permeable McLish, Bromide, and Viola formations that are open in these holes, in common with the lower productive zone.

During October 1937 at the request of the Geological Survey, an attempt was made to set a tubing packer in lime at about 4,570 feet in well No. 1, below the dry gas formation and above the productive oil zone to determine whether underground waste or migration was occurring and to what extent and, also, to partially correct the existence of unsatisfactory mechanical conditions. While pulling the tubing under pressure, a blowout occurred which killed 3 men. Because of resulting damage to surface control valves, no further remedial work could be undertaken safely without first killing the well. Therefore, the well was put back on production in all zones from 3,920 to 4,693, still subject to pressure equalization and present oil and gas migration with the resultant dissipation of reservoir energy and possible dissemination of oil from the productive zone into barren or thief sands. Adequate conditioning of the well would now require killing the oil and gas production with mud fluid and it is thought that greater damage might be done to the present producing formation by mudding them to permit its continued operation in its present unsatisfactory mechanical condition.

Since October 1937 the Geological Survey has required that production strings in wells drilled on Indian lands in the Jesse field be set and cemented in the lime on top of the producing zone. This case is exemplary of the necessity for proper casing programs to adequately protect productive sands from dissipation, water infiltration, migration, and dissemination of commercial deposits of oil and gas.

In many cases where wells are improperly drilled, cased, and operated, it frequently becomes most difficult, if not impossible, after production has commenced to perform properly desirable or necessary remedial work.

Unprocessed casing-head gas having an average gasoline content of approximately 0.96 gallons per thousand cubic feet is also being wasted in the Jesse field. The volume of gas produced incidentally with the oil, which is blown to the air without the extraction of natural gasoline, is estimated to be at least 10,000,000 cubic feet daily. None of the gas in this field is being processed for gasoline extraction.

Physical waste of natural gas by blowing to the air with and without extraction of natural gasoline, with an estimate of the volume and an estimate of the g. p. m. for the wet gas blown to the air

Allen.—Waste of both gas and reservoir energy occurs on a lease in the Allen field on which 5 oil wells and 1 gas well were drilled during the period November 1937 to August 1938. The largest producer on the tract, well No. 3, was completed with an initial production of 85 barrels of oil per day and 1,500,000 cubic feet of gas. The gas from the 5 oil wells was blown into the air and burned. Some 3,500,000 cubic feet was disposed of daily in this manner for several months. The district engineer called the matter to the attention of the Oklahoma State conservation officer because of the fact that Indian leases adjoin the lease on which the waste was taking place. The volume of gas blown to the air was subsequently reduced but the original waste at times recurred. On this particular lease the gas producing formation lay directly on top of the oil-bearing formation; had the casing been properly set through the formation containing gas, a matter of 7 to 26 feet, in all of the 5 wells, it is considered that a larger initial production of oil would have resulted with lower gas-oil ratios and less gas waste. The casing program on Indian leases in this field was developed in a manner to prevent the dissipation of the gas energy lying on top of the productive oil zone and to utilize to the best advantage that energy for the recovery and production of oil.

Fitts.—The Fitts pool is located in the southeast corner of T. 2 N., R. 6 E., and the south half of T. 2 N., R. 7 E. The first oil production was found in July 1933, in the Lower Hunton Lime. In June 1934, the Bromide zone was discovered. In April 1935, production was discovered in the Upper McLish sands, and in July 1935, prolific production was found in the Basal McLish or "Wilcox" sand (The Fitts Pool—Its Geology and Development, by K. R. Teis and Maurice Teis, Oil and Gas Journal, March 4 and 11, 1937).

The latest reliable data on well count by producing formations show that as of January 1, 1939, there were 962 producing wells in the field as follows:

Producing formation:	*Number of wells*
Shallow	45
Cromwell	107
Hunton	340
Upper Simpson	428
Wilcox	41
Oil Creek	1

The Oklahoma Corporation Commission allocation reports for December 1939, show 850 producing wells in the entire field without classification by formation.

No record of bottom-hole pressures or gas-oil ratios of the separate producing formations in the Fitts pool is available over any sufficient period of time except for the Simpson formation; therefore, the data submitted relative to bottom-hole pressures and gas-oil ratios are limited to the Upper Simpson, which formation to date has produced the majority of the oil in the entire field and is probably the most important.

The Upper Simpson which includes the Viola lime, the Bromide and Upper McLish formations has been considered by State officials as a common source of supply in this field and these formations are exposed and produced together in most Upper Simpson wells.

To December 1, 1939, the reports of the Oklahoma Corporation Commission indicate a total field production of 81,880,000 barrels of oil from all formations. It is estimated that approximately 58,000,000 barrels, or 72 percent of the total field production, was obtained from the Upper Simpson zone.

The act of the Oklahoma State Legislature approved April 10, 1933, known as House bill 481, provides for the taking of potentials of each well in a common source of supply at periods not to exceed 6 months where proration is necessary to prevent waste. Well potentials and allowables have been based on the individual producing formations. Pursuant to orders of the corporation commission, as provided by the act, the field potentials of the Upper Simpson wells were made by actual production tests during January and July 1935, and January 1936. Effective August 1, 1936, and to continue to February 1, 1940, the operators elected to reduce the potentials of each well for each 6-month period at the rate of 3 percent decline per month, except for the period August 1, 1938 to February 1, 1939, when a decline of 10 percent per month was made as an experiment to see if a lower rate of production would tend to retard the rate of decline in reservoir energy. It is reported that no appreciable effect was noted in the rate of pressure decline during that period.

For the period February 1 to August 1, 1940, well potentials are to be reduced at the rate of 1 percent per month.

Detailed data for the Upper Simpson formation was maintained by the Fitts Pool Engineering Committee, composed of representatives of the operating companies, during the period January 1935, through October 1937. The entire field was prorated by the Corporation Commission on a unit or lease basis effective November 1, 1937, without regard to individual formations. The lease allowable could be produced from any one or all of the producible formations. No production data segregated by formations therefore is available after October 1937.

The available data with respect to the relationship of allowables, production, bottom-hole pressures and gas-oil ratios of the Upper Simpson wells are shown in a table (fig. 8) attached hereto. Also attached is a chart (fig. 9) showing graphically the data based on actual monthly pipe-line runs, cumulative production, weighted average bottom-hole pressures, and gas-oil ratios of the Upper Simpson wells, as shown numerically in figure 8.

Inspection of figures 8 and 9 discloses a reasonably constant decrease in bottom-hole pressures and that the monthly rate of production during the stage of flush production in 1936 and 1937 was fairly constant, resulting in almost a straight line curve for the cumulative production during that period. The percent of allowables to potentials did not vary greatly and the actual monthly pipe-line runs follow closely the monthly allowed production. The rate of bottom-hole pressure decline per million barrels of oil produced is fairly constant during 1936 and 1937. A more restrictive allowed production, however, would probably have tended to maintain the pressures at a higher level over a longer period of time. Since October 1937 no bottom-hole pressures on Upper Simpson wells which could be compared to previous tests have been taken.

The gas-oil ratios for the period January 1935 to July 1937, are based on a total of approximately 190 actual individual well tests on 85 wells and are considered quite representative for the entire Upper Simpson formation during that period. From July 1937 to July 1939 only 9 individual well tests were made and these were made on offending wells of known high gas-oil ratios for the purpose of attempting to correct the unsatisfactory ratios. The estimates for this period undoubtedly are in excess of the average gas-oil ratios over the entire pool.

As of July 1939, estimates of gas-oil ratios, determined in part by projection of prior trends and in part by the few later tests, are averaged with the following results: maximum gas-oil ratio 14,200 cubic feet per barrel in the area above the 3,100-foot contour as traced on top of the Bromide, and a minimum of 5,200 cubic feet per barrel in the area below the 3,200-foot contour, the average being 8,700 cubic feet per barrel.

A complete record of production to date from the Upper Simpson formation is reported from 85 wells of one company which produced a total of 11,467,648 barrels of oil from 1934 to 1939, inclusive. Of this total production during the period indicated 0.2 percent was produced in 1934; 11.8 percent in 1935; 34.8 percent in 1936; 32.3 percent in 1937; 13.9 percent in 1938; and 7.0 percent in 1939.

The actual pipe line runs from all Upper Simpson wells follow closely the percentage relationship of the production from the above group of wells for the period January 1935 to October 1937. Using the same relationship of yearly percentages of production the actual production from all Simpson wells has been roughly estimated to December 31, 1939, as previously stated herein, at 58,000,000 barrels. The curve of monthly production on figure 9, attached hereto, has been extended on the same basis.

Plans are now being formulated by operators for a comprehensive gas repressuring program for the Upper Simpson formation. At this time gas is being injected experimentally in four wells at pressures ranging from approximately 70 to 750 pounds per square inch. The volume of gas being injected approximates 500,000 cubic feet of gas per day per well. Under such a program it is planned to use surplus available residue gas from the gasoline plants in the field and to reduce the waste of such gas heretofore and presently being blown to the air.

The Fitts pool at present has prevalent methods and practices which have caused, and are causing, waste of natural gas by blowing into the air before and after extraction of natural gasoline. It is estimated that approximately 45,000,000 cubic feet of gas per day is now being wasted after having the natural gasoline extracted therefrom, and approximately 11,000,000 cubic feet daily of wet gas is blown to the air without the extraction of the natural gasoline contained therein. The average gasoline content of wet gas in this field is approximately 1.2 gallons per thousand cubic feet of gas. At the rate at which this wet gas is blown to the air the gasoline lost is in excess of 13,000 gallons daily.

This field is served by three gasoline plants of major operators. Most of the leases producing sufficient casing-head gas, in the opinion of the plant operators, to justify the cost of a line to collect the gas, are connected to a gasoline extraction plant.

Fox and Graham.—An example of gas waste after extraction of natural gasoline is found in the Fox and Graham fields, where the casing-head gas coming from many producing oil wells totals approximately 10,000,000 cubic feet daily, which is collected throughout these fields and processed for gasoline extraction. From two to three million cubic feet daily of the residue gas is returned to the contributing leases for their operation and seven to eight million cubic feet daily of residue gas is blown to the air.

WYOMING

Medicine Bow.—In this field two formations are productive—the First and Second Sundance sands. Tight sand conditions in the First Sundance sand necessitates slow withdrawal of the fluid in order to obtain maximum recovery. The operator has produced wells at excessive rates from patented and State lands, thereby forcing a higher production rate from wells on public land. As a consequence of such practice, higher production rates than are considered efficient have been the result. Excess gas has been transported to another field for repressuring. Loss of reservoir energy in this field has occurred. Original estimates of the reserves were from seven to twenty million barrels, while a reasonable estimate at this time places the reserves at 3,000,000 barrels, of which an estimated 1,500,000 will be recovered under present production practices.

The Second Sundance sand is under hydrostatic control. Excess rates of production cause excessive emulsification of the oil; however, the oil which has a very high gravity readily separates and there is little or no waste of oil by reason of emulsification. Previous production rates indicate recovery of 65 percent of the oil while recent restricted production indicates that a recovery of 75 percent may be expected under present production methods.

Two wells drilled in the Medicine Bow field on patented land were completed in the following manner:

Gas was found in the first sundance sand and oil in the second sundance sand, located about 100 feet below the first sundance. A liner was cemented between the two sands with a packer run on 2½-inch tubing and set in the liner. Oil was produced from the second sundance sand through tubing and gas from the first sundance sand through the casing. After the well on patented land had been on production for approximately 2 years, second sundance oil was found coming from the first sundance sand. In repairing the well the operator found that the second sundance oil had been leaking around the liner into the first sundance sand. After attempting to recement the liner, the well produced mostly water in the second sundance, and this is no doubt second sundance water, as the well showed evidence of water in the bottom part of the sand when drilled.

The offset well on Government land was completed in the same manner but showed no evidence of leaking from the date of completion in June 1935 to October 1938. By December 1938 there was strong evidence of second sundance oil leaking into the first sundance sand and the operator was called upon to make necessary repairs, but the work was not done until November 1939. On going into the well the packer was found defective and it was replaced. After repair the first sundance sand became productive of gas, expelling some of the migratory second sundance sand oil, and the offset well on patented land producing oil from the first sundance which resembled second sundance oil dropped in production from around 200 barrels per day to 50 barrels per day. This is conclusive evidence of migration of oil from the second to the first sundance sand. Bottom-hole pressures at the present time in the second sundance are approximately 2,100 pounds per square inch, and in the first sundance about 1,200 pounds per square inch. Neither the amount of oil that migrated into the first sundance nor the amount of loss resulting therefrom can be accurately determined.

Improper practices and methods of production

Oregon Basin.—There are 38 wells in this field which produce oil from the Embar or Tensleep formations, or both. Thirty-six of the wells are on public lands of the United States. The rate of production is irrregular and dependent upon limited market requirements. When most of the wells are being produced it is estimated that from six to eight million cubic feet of gas per day is blown to the air or burned in flares. The gas is sour and entirely unsuitable for domestic use. This gas, through unitization of the field, might be returned to the sands or stored in other horizons for subsequent use in the recovery of oil from this field. Improper well completion methods have probably resulted in wells being drilled too deep, with consequent water coning and possible entrapment of oil which cannot be recovered. Repair work has been done on certain wells, but there is much to be accomplished in this direction.

North Dome Oregon Basin.—Improper producing methods are employed in a local area on the North Dome of the Oregon Basin field. Eight wells have been drilled in this area and for several years were produced to near capacity, with the wells in the NE¼ of sec. 7 still on regular production. Water has appeared in wells in this area and varies in volume from 10 to as high as 90 percent. In this particular area, wells are showing water as much as 500 feet higher than the level of the normal water table, indicating excessive withdrawals, which have resulted in local water encroachment with the attendant possibility of trapping oil, thereby reducing the recoverable oil to be obtained from the productive horizons.

Physical waste of natural gas by blowing to the atmosphere with and without extraction of natural gasoline, with an estimate of the volume

Frannie.—In this field the wells are pumped and gas-oil ratios are less than 1,000 cubic feet of gas per barrel of oil. Only a small amount of gas is used in the field for fuel and the remainder is burned in flares. The gas is sour and unsatisfactory for domestic use. Through unitization or a cooperative agreement, the gas might well be returned to the sands to maintain reservoir pressure and increase the percentage of recoverable oil. During 1938 the field produced approximately 1,000,000 cubic feet of gas per day when the wells were being pumped. There are both public and patented lands in the field.

Garland.—In the Garland field a large part of which is unitized, gas is wasted from lands operated by a company not committed to the unit agreement. The area of the holdings of this company constitutes approximately 27 percent of the productive area of the field. Gas not utilized within the unit is returned to a shallow sand by the unit operator, but this practice is not followed by the company whose patented acreage is not committed to the unit agreement and all excess gas is being blown to the air or burned in flares. Recently the production from the acreage not committed to the unit agreement has been approximately 3,000 barrels per day, and, when produced at this rate, it is estimated that between five and six million cubic feet of gas per day is blown to the air. The gas is sour and contains 0.2 of a percent to 0.9 of a percent hydrogen sulfide. No test of the gasoline content is now available. There is no available market for the gas at this time; however, the reservoir energy is being dissipated at a rapid rate because of the practices of one operator.

Osage.—Considerable waste of gas occurs in this field by reason of the failure of the operators to use vapor-tight tanks and to develop a market for the gas. The gas which is produced with the oil escapes to the air. It is necessary to produce the gas in order to obtain the oil, and it is a question whether an appreciable loss of reservoir energy occurs. The gas, if saved, might profitably be returned to the oil sands. A more efficient casing program, including the cementing of casing at proper depths, is to be desired on patented lands located in this field.

Waste or dissipation of reservoir energy because of excessive gas-oil ratios

Lance Creek.—In the early life of the Lance Creek field producing wells on the crest of the structure in the basal sundance sand showed high gas-oil retios and there was a rapid drop in bottom-hole pressures, with the result that the pressure had dropped below the saturation point before an agreement was reached between the operators for unitization of the basal sundance sand. Since unitization, the excess gas is returned to the sand and pressures maintained so far as possible. Without the unit plan or other agreement for returning the gas to the sand it is believed that the ultimate recovery would have been greatly reduced and the cost of production increased.

This field is in part, as previously state, operated under a unit plan. That part of the gas produced by wells in the unit area for which no market exists is returned to the productive sands for repressuring purposes. Physical waste of crude oil in the field is believed to be at a minimum. In some cases excessive production rates of certain wells have indicated the possiblilty of premature encroachment of edgewater and the resultant entrapment of oil, as well as the premature release of natural gas from solution in the oil which has a detrimental effect upon the ultimate recovery of oil from the reserves of the field. In certain cases gas-oil ratios for wells not subject to the unit agreement have been excessive and wasteful of reservoir energy. Present regulations and State conservation measures do not seem to be sufficiently forceful or effective to prevent such waste and it may be assumed that unsatisfactory or wasteful methods will continue in certain parts of the field unless the regulations are more effectively enforced. Such conditions as these clearly indicate the value of supervision and regulation by one competent authority under adequate regulations. The unit agreement has been very effective in curtailing and preventing waste, and it is estimated that the percentage of recovery will be increased at least one-eighth or more under unit operation.

An example of waste of reservoir energy and unduly rapid encroachment of edgewater may be found in one well on patented land in section 7 of this field. This well was completed as an edge well in the sundance and was produced full capacity at the rate of 800 barrels per day. The well produced at an unrestricted rate to exhaustion with a cumulative production of 25,000 barrels. Another well located in section 7 on a Government lease, approximately on the same structure contour, was produced at a more moderate rate and yielded 70,000 barrels up to the time of its depletion. The well of another company located in section 7 of this field, a direct offset to another well referred to in section 7, was also produced at a moderate rate and has yielded 125,000 barrels of oil and is still capable of producing.

The leo sand in the Lance Creek field varies in porosity from well to well. Unless production is carefully regulated the reduction of bottom-hole pressures and advancement of edgewater in the more porous sand areas will, in all probability, result in the entrapment of oil in the less porous and less permeable sands. One company operating on a patented tract has persisted in producing at a higher rate than other operators, thus preventing the initiation of an effective and efficient production program for the part of the field in which the nonparticipants in the agreement are located. Waste in the Lance Creek field has been reduced since the unit plan became effective; however, there are several tracts of patented land under lease to operators who are not signatory to the agreement and there is no doubt but that further reduction of waste by proper cooperation between outside operators and unit operators would be highly beneficial in preventing avoidable waste now occurring and in increasing the ultimate recovery of oil.

Relation of Federal supervisory forces to State regulatory forces

The appropriation of inadequate funds for the regulation and supervision of oil and gas operations on public and Indian lands results in inefficient and ineffective jurisdiction, which indirectly indicates on the part of the Federal Government that there is prevalent either a lack of appreciation of the relationship of such oil and gas supervision on public lands and Indian lands to the conservation of the Nation's natural resources, or that it is considered that such conservation is not essential. If Federal administration is inefficiently and ineffectively pursued, there will be no example of sound conservation established which the States can look to as a model to be copied or to be guided by.

No doubt new reserves of petroleum and natural gas will be discovered from time to time, but no plans for national defense or industrial development can be formulated, which plans are based upon unknown reserves; therefore, every effort should be exerted in the direction of conserving known reserves through the prevention of avoidable waste. The proper place to start such a program of conservation is with the oil and gas leases on public and Indian lands of the United States which are under the jurisdiction and regulation of the Department of the Interior.

With the funds and personnel available every possible effort is exerted by the field representatives of the Geological Survey to enforce in a reasonable and practical manner the provisions of the law, the regulations, and the leases, in an effort to reduce to a minimum all waste on the lands under supervision. The extent to which the efforts of the Geological Survey in preventing avoidable waste may be carried is dependent, in a measure, upon the relationship of the public and Indian lands to State and patented lands, over which the Federal Government has no regulatory authority. With a wide variety of conservation statutes and an even greater variation in the degree of enforcement of existing laws, good as they may be, it has been found at times most difficult, if not impossible, to enforce effectively practices and methods of operation on public and Indian lands which are in the interest of conservation, because of the methods and practices prevalent on adjoining lands not under supervision.

In the prevention of waste on patented or State lands, because of the effect of such waste on public or Indian lands, the operator of leases on such lands is frequently contacted directly by representatives of the Geological Survey and requested to take the action or to pursue the methods and practices desired or considered necessary to prevent such waste, because this procedure is, in general, more simple and frequently productive of more satisfactory results. Lack of effective enforcement, in part, may be due to inadequate personnel of the State regulatory authority. The operator of leases on patented land or State land is frequently also the operator on adjoining or adjacent Federal or Indian lands and, because of this position, it may appear wise to him to cooperate by conforming to any reasonable suggestions made by Federal supervisory representatives.

One of the greatest single sources of annoyance to the supervisory officials of the Geological Survey with some State regulatory bodies is the total lack of consideration, conferences or discussions with Survey representatives, or notices of hearings, or copies of orders of the State regulatory authority which generally affect all classifications of land within the State. In New Mexico, for example, about one-third of the productive lands and wells in the southeastern part of the State are under Federal jurisdiction. In Wyoming, the bulk of production is withdrawn from leases on lands of the public domain.

In New Mexico, a hearing relative to gas-oil ratios was held on December 9 and, according to information received in Washington, advice of such hearing was not furnished to any representative of the Geological Survey, nor was there any opportunity afforded to express the views and opinions of the Geological Survey representatives. It is believed that there is a great deal of room for more effective cooperation between the State and the Federal regulatory bodies in the several States in which there are public and Indian lands. There should be close cooperation, and through such close cooperation, each organization stands to benefit materially from the exchange of views and information concerning the modern technique of oil and gas development and production.

Summary of underlying causes of waste cited

Waste as cited herein may be generally classified under two main headings: (1) Physical waste of crude oil, both surface and subsurface; (2) waste of reservoir energy.

Under the first classification of waste, subsurface waste is at present by far the most important type of physical waste. Such waste is generally caused by the application of improper casing programs which fail to protect productive oil-bearing formations from water infiltration, dissipation of oil in barren or thief sands, or dissipation into other sands having a lower formation pressure with a tendency toward the dissemination of oil to such an extent that it is no longer commercially profitable to recover.

The second classification of waste, the waste of reservoir energy occurs through unnecessary dissipation of the original formation energy. This may be caused by improper casing programs which permit the dissipation and dissemination of the energy; also, by excessive gas-oil ratios and premature release of natural gas from solution in the oil in the reservoir. These unsound and inequitable practices of development and production are due basically to the division of land ownership which stimulates the landowner and the owner of operating rights to drill excessive wells and make excessive withdrawals of oil in local areas, regardless of the effect upon the field as a whole, since the rule of capture is still the "law of the land." Therefore, the ever-present human desire for quick profits, without regard to the equities of others, holds the fort and is never satisfied. From these causes and because of the results thereof rise fictitious arguments, wishful thinking, and other ingenious arguments favoring the action one wishes to pursue.

The effect of such forms of waste are the reduction of recoverable oil and increased lifting costs per barrel of oil recovered.

Methods and practices of drilling and production are formulated on such foundations and however conscientious one may be, the judgment and action in such cases frequently reflect the ever-present human element. Only in the case of relatively few examples of waste of oil and gas resources through either physical waste or waste of reservoir energy can such waste be attributed to ignorance. Until there is some sound, reasonable, and practical legislative control efficiently and effectively enforced there is little hope of preventing a great amount of avoidable waste.

Although it may be recognized and admitted that the industry has made commendable strides in the direction of the prevention of avoidable waste, nevertheless, there are many operators who have no regard for the rights of others and who must be controlled for the common good of all. A single operator by his operations in a field may completely disrupt an otherwise orderly plan of development unless there is existent adequate law to require his conformance to an intelligent plan of development and operation of the field.

State and field	Physical waste crude oil—Underground loss or dissipation due to improper casing program exposing excessive open hole or gas zones—Improper practices—Methods of production and withdrawal	Physical waste natural gas—Blowing natural gas to atmosphere—		Waste of reservoir energy—Excessive gas-oil ratios, premature release of natural gas from solution in crude oil	Waste caused by—		Remarks
		After extraction—Natural gasoline, daily estimated volume (cubic feet)	Without extraction—Natural gasoline, daily estimated volume (cubic feet)		Certain operators	Operators generally	
California: Kettleman Hills North Dome.				B		X	
Colorado: North McCallum.				K	X		90 percent CO_2 gas.
Louisiana:							
Cotton Valley				K		X	
Rodessa				K		X	
Shreveport				K		X	
Montana:							
Bowdoin						X	Gas field.
Cut Bank				K		X	Gasoline extracted from gas from gas wells. Gas from oil wells not picked up.
Kevin-Sunburst.				K		X	Gas from oil wells not picked up.
New Mexico:							
Getty	B			K		X	
Wills	B			K		X	
Northwest Lea	B			K		X	
North Lea	B			K		X	
Lea	B			K		X	
Monument	B	25,000,000	13,000,000	K		X	
Hobbs	B	12,000,000		K		X	
Skaggs	B		30,000	K		X	
Eunice	B	45,000,000	15,000,000	K		X	
South Eunice	B		10,000,000	K		X	
Cooper-Lynn	B		29,000,000	K		X	
Jal	B		2,000,000	K		X	
Eaves	B		2,500,000	K		X	
Stuart-Langlie			12,000,000	K		X	
Skelly-Simms		3,000,000		K		X	
Penrose-Hardy		12,000,000	3,000,000	K		X	
Mattix			7,000,000	K		X	
Pecos Valley				K		X	
Red Lake			400,000	K		X	
Leonard-Levers			100,000	K		X	
Grayburg			1,000,000	K		X	
Jackson			2,000,000	K		X	
Robinson			400,000	K		X	
Baish			125,000	K		X	
Empire				K		X	
Compton				K		X	
Artesia				K		X	
Black River				K		X	
Mitchell				K		X	
Skelly				K		X	
Loco Hills			2,250,000				

State and field	Physical waste crude oil—Underground loss or dissipation due to improper casing program exposing excessive open hole or gas zones—Improper practices—Methods of production and withdrawal	Physical waste natural gas—Blowing natural gas to atmosphere—		Waste of reservoir energy—Excessive gas-oil ratios, premature release of natural gas from solution in crude oil	Waste caused by—		Remarks
		After extraction—Natural gasoline, daily estimated volume (cubic feet)	Without extraction—Natural gasoline, daily estimated volume (cubic feet)		Certain operators	Operators generally	
New Mexico—Con.							
Shugart			325,000				
South Lovington			250,000				
Vacuum			3,000,000				
Oklahoma:							
Allen	B			K	X		
Fitts	B			K		X	
Fox-Graham				K	X		
Jesse	B			K	X		
Milroy (deep)				K	X		
Traugh	B				X		
Wyoming:							
Badger Basin				K		X	
Baxter Basin	B			B	X		
Frannie				K		X	Sour gas unfit for domestic use.
Garland				K	X		Sour gas—limited commercial use.
Lance Creek	B			K	X		Waste could be reduced by cooperation unitized and nonunitized interests.
Medicine Bow	B			K	X		
Oregon Basin	B			K		X	Sour gas. Field produced only to meet market demand.

K = Known.
B = Believed.

FIGURE 2.—*Kettleman Hills north dome, comparison of high gas-oil ratio production—Temblor zones*

	Oil, barrels	Gas. M cubic feet	Gas-oil ratio	Percent of total field		Remainder of field [1]		
				Oil	Gas	Oil	Gas	Gas-oil ratio
FROM DISCOVERY TO AUG. 1, 1939								
Total field	213, 103, 432	[2] 1, 181, 238, 851	5, 543	------	------	------------	------------	------
Group A	10, 225, 789	397, 278, 874	38, 851	4. 79	33. 63	202, 877, 643	783, 959, 977	3, 864
Group B	6, 472, 734	162, 717, 600	25, 139	3. 03	13. 78	------------	------------	------
Groups A and B	16, 698, 523	559, 996, 474	33, 536	7. 85	47. 41	196, 404, 909	621, 242, 377	3, 238
Group C	4, 855, 977	69, 398, 183	14, 291	2. 28	5. 87	------------	------------	------
Groups A, B, and C	21, 554, 500	629, 394, 657	29, 200	10. 13	53. 28	191, 548, 932	551, 844, 194	2, 959
Group D	659, 658	9, 296, 249	14, 093	. 31	. 79	------------	------------	------
Groups A, B, C, and D	22, 214, 158	638, 690, 906	28, 752	10. 44	54. 07	190, 889, 274	542, 547, 945	2, 921
FROM AUG. 1, 1938, TO AUG 1, 1939 (1 *year*)								
Total field	20, 654, 619	[2] 100, 781, 174	4, 879	------	------	------------	------------	------
Group A	164, 593	11, 823, 259	71, 833	. 80	11. 73	20, 490, 026	88, 957, 915	4, 342
Group B	350, 552	11, 649, 396	33, 232	1. 70	11. 55	------------	------------	------
Groups A and B	515, 145	23, 472, 655	45, 565	2. 50	23. 29	20, 130, 474	77, 308, 519	3, 840
Group C	125, 214	2, 594, 610	20, 721	. 60	2. 57	------------	------------	------
Groups A, B, and C	640, 359	26, 067, 265	40, 707	3. 10	25. 86	20, 014, 260	74, 713, 909	3, 733
Group D	179, 953	2, 218, 833	12, 330	. 87	2. 20	------------	------------	------
Groups A, B, C, and D	820, 312	28, 286, 098	34, 482	3. 97	28. 066	19, 834, 307	72, 495, 076	3, 655
Section 29–J	2, 095, 524	22, 338, 302	10, 660	10. 15	22. 17	------------	------------	------
Groups A, B, C, D, and Section 29–J	2, 915, 836	50, 624, 400	17, 361	14. 12	50. 23	17, 738, 783	50, 156, 774	2, 828

Group A—K. N. D. A. wells 47–2P, 58–2P, 88–2P, 1–12P; S. O. Co. wells 8–1P, 81–11P, 261–1P (discovery area).

Group B–K. N. D. A. wells 52–2P, 41–2P, 51–2P; S. O. Co. wells 48–35J, 38–35J; Pet. Sec. "Felix" 1 (Felix area).

Group C—K. N. D. A. wells 27–34J, 38–34J; S. O. Co. 41–3P, 32–3P.

Group D—K. N. D. A. wells 61–20Q; S. O. Co. 58–17Q.

[1] Production figures under this heading are field totals less production figures for groups listed at left.

[2] Records indicate about 200,000 M cubic feet of gas injected and lost in gas lift. Complete figures might show slightly more.

(Maps referred to filed with the committee.)

FIGURE 4.—*Kettleman Hills North Dome, comparison of sec. 29–J production—Temblor zones*

	Oil barrels	Barrels oil per acre	Gas, M cubic feet	M cubic feet gas per acre	Gas-oil ratio	Percentage of total field		
						Oil	Gas	Acreage
FROM DISCOVERY TO AUG. 1, 1939								
Superior Oil Co., NE¼ sec. 29–J (160 A.)	[1] 13, 942. 705	87, 142	[1] 42. 110, 549	263, 191	3, 020	6. 54	3. 57	0. 96
Union Oil Co., SW¼ sec. 29–J (160 A.)	9, 835. 436	61, 470	41, 485, 330	259, 283	4, 218	4. 62	3. 51	. 96
Standard Oil Co., NW¼ sec. 29–J (160 A.)	10. 670, 654	66, 692	30, 464, 714	190, 404	2, 855			
Standard Oil Co., SE¼ sec. 29–J (160 A.)	7. 826, 570	48, 916	41, 983, 288	262, 396	5, 364			
Standard Oil Co., total sec. 29–J (320 A.)	18, 497, 224	57, 804	72, 448, 002	226, 400	3, 917	8. 68	6. 13	1. 91
Total sec. 29–J (640 A.)	42, 275, 356	66, 055	156, 043, 881	243, 819	3, 691	19. 84	13. 21	3. 83
Remainder of field (16,090 A.)	170, 828. 076	10, 617	1, 025, 194, 970	63, 716	6. 001	80. 16	86. 79	96. 17
Total field (16,730 A.)	213. 103, 432	12, 738	1, 181. 238, 851	70, 606	5, 543			
FROM AUG. 1, 1938, TO AUG. 1, 1939 (1 YEAR)								
Superior Oil Co., NE¼ sec. 29–J (160 A.)	371, 220	2, 320	7, 981, 856	49, 887	21, 502	1. 80	7. 92	. 96
Union Oil Co., SW¼ sec. 29–J (160 A.)	959, 483	5. 997	7. 185, 511	44, 909	7, 489	4. 65	7. 13	. 96
Standard Oil Co., NW¼ sec. 29–J (160 A.)	499, 775	3, 124	3, 668, 851	22, 930	7, 341			
Standard Oil Co., SE¼ sec. 29–J (160 A.)	265, 046	1, 657	3, 502, 084	21, 888	13, 213			1. 91
Standard Oil Co., total sec. 29–J (320 A.)	764, 821	2, 390	7, 170, 935	32, 409	9, 376	3. 70	7. 12	
Total sec. 29–J (640 A.)	2, 095, 524	3, 274	22, 338, 302	34, 904	10, 660	10. 15	22. 17	3. 83
Remainder of field (16,090 A.)	18, 559, 095	1, 153	78, 442, 872	4, 875	4, 227	89. 85	77. 83	96. 17
Total field (16,730 A.)	20, 654, 619	1, 235	100, 781, 174	6, 024	4, 879			

[1] Superior Oil Co. well No. 1 production to Aug. 1, 1939, 6.492,121 barrels of oil and 14,634,710 M cubic feet of gas.

FIGURE 5.—*Kettleman Hills North Dome, methods of production—Temblor Wells, August 1939*

	Shut in	Natural flow	Pumping	Gas injection	Gas lift	Total
K. N. D. A.:						
Government lands	33	24	1	1	62	121
Fee lands	3	6			4	13
Total	36	30	1	1	66	134
S. O. Co	12	50	5	0	47	115
Others	2	9	1	0	12	24
Total	14	59	6	0	59	139
Grand total	50	89	7	1	125	273

FIGURE 6.—*Kettleman Hills North Dome crude oil production and proration data—Oil Umpire's report of June 1939 (includes all zones—Temblor and Eocene)*

	Number of wells		Producing time (percent)	Estimated capacity, (barrels per day)[1]			Allotment, barrels per day	Production, barrels per day
	Idle	Producing		Idle	Producing	Total		
K. N. D. A.	25	101	86.5	17,412	43,882	61,294	16,753	24,928
S. O. Co.	1	101	100.0	50	39,135	39,185	15,926	23,504
Tide water	0	3	78.0	0	325	325	223	316
North American, R. S. Lytle, operator	0	5	----------	0	684	684	448	686
Shell Oil Co.	0	1	93.0	0	32	32	40	30
Superior	0	7	100.0	0	1,069	1,069	798	1,069
Union	1	7	100.0	40	2,510	2,550	1,109	1,980
Total	27	225	----------	17,502	87,637	105,139	35,297	52,513

[1] Estimated capacity is that daily rate of production which a well or property should produce at a continuous and sustained rate for one month, without injury to the well and to assure the most efficient recovery under optimum conditions.

FIGURE 7

Field 1	Gas blown to atmosphere before extraction of natural gasoline 2	Daily estimated volume (cubic feet) 3	Gas blown to atmosphere after extraction of natural gasoline 4	Daily estimated volume (cubic feet) 5	Estimated minimum gas-oil ratio[1] 6	Estimated maximum gas-oil ratio[1] 7	Estimated average gas-oil ratio[1] 8
EDDY COUNTY							
Grayburg	X	1,000,000	--------	------------	500/1	2,500/1	800/1
Jackson	X	2,000,000	--------	------------	500/1	10,000/1	900/1
Leonard-Levers	X	100,000	--------	------------	1,000/1	1,500/1	1,250/1
Loco Hills	X	2,250,000	--------	------------	500/1	5,000/1	800/1
Red Lake	X	400,000	--------	------------	800/1	2,500/1	1,500/1
Robinson	X	400,000	--------	------------	600/1	5,000/1	1,000/1
Shugart	X	325,000	--------	------------	700/1	10,000/1	1,000/1
Total, Eddy Couty	--------	6,475,000	--------	------------	----------	------------	----------
LEA COUNTY							
Baish	X	125,000	--------	------------	600/1	1,500/1	800/1
Cooper-Lynn	X	29,000,000	--------	------------	675/1	100,000/1	11,000/1
Eaves	X	2,500,000	--------	------------	450/1	29,000/1	4,500/1
Eunice	X	15,000,000	X	45,000,000	400/1	66,000/1	4,800/1
Hobbs	--------	------------	X	12,000,000	530/1	12,000/1	2,000/1
Jal	X	2,000,000	--------	------------	600/1	26,000/1	6,000/1
Mattix	X	7,000,000	--------	------------	600/1	27,000/1	3,000/1
Monument	X	13,000,000	X	25,000,000	400/1	48,000/1	3,000/1
Penrose- Hardy	X	3,000,000	X	12,000,000	415/1	64,000/1	4,200/1
Skaggs	X	30,000	--------	------------	400/1	5,000/1	2,000/1
Skelly-Sims	--------	------------	X	3,000,000	730/1	10,000/1	3,800/1
South Eunice	X	10,000,000	--------	------------	450/1	34,000/1	5,000/1
South Lovington	X	250,000	--------	------------	440/1	1,500/1	800/1
Stuart-Langlie	X	12,000,000	--------	------------	400/1	54,000/1	3,200/1
Vacuum	X	3,000,000	--------	------------	410/1	5,000/1	900/1
Total, Lea County	--------	96,905,000	--------	97,000,000	----------	------------	----------
Total, Lea and Eddy Counties	--------	103,380,000	--------	97,000,000	----------	------------	----------

[1] Refers to flowing wells only.

FIGURE 8.—*Fitts Pool, Pontotoc County, Okla.—Upper Simpson Wells*

	Monthly pipe-line runs [1]	Monthly allowed production [1]	Percent of allowed production to potential [1]	Cumulative production [2]	Weighted average bottom hole pressure (pounds per square inch)[2]	Bottom hole pressure decline per million barrels production (pounds per square inch)[2]	Gas-oil ratio (cubic feet per barrel)		
							Minimum [3]	Average [4]	Maximum [3]
	Barrels	*Barrels*		*Barrels*					
January 1935	261,760	281,868	[5] [6]10.00		1,883		500	600	700
April	377,923	358,380	[6] 4.00	800,967	1,808	93.7			
July	581,583	432,893	[6] 3.25	2,126,794	1,723	75.3	400	700	1,500
October	907,609	813,455	5.00	3,761,659	1,662	58.7			
January 1936	1.045,808	958,096	4.60	6,747,951	1,517	54.4	500	1,000	1,600
April	1,470,723	1,349,638	6.75	10,451,717	1,456	40.8			
July	1,360,020	1,256,471	4.50	15,011,528	1,367	34.4	700	1,600	2,000
October	1,781,777	1,652,539	6.20	19,513,311	1,188	35.6			
January 1937	1,750,650	1,761,229	6.00	24,461,623	1,080	32.4	1,200	2,700	3,500
April	1,743,898	1,768,870	7.10	29,572,036	834	35.5			
July	1,607,356	1,690,204	6.30	34,534,139	667	35.2	(7)	3,600	(7)
October	(7)	1,553,560	7.00	38,850,549	485	36.0			

[1] Data from published Oklahoma Corporation Commission records.

[2] Data from Fitts Pool Engineering Committee. Records commenced Jan. 1, 1935. Small production in 1934 not classified to formations.

[3] Individual well tests.

[4] Estimated weighted averages by K. R. Teis based on tests on 85 representative wells.

[5] Jan. 1-13, 1935, allowed 100 barrels per well per day. Jan. 14-31, 1935, allowed 10 percent of potenial.

[6] Classified and referred to by the Oklahoma Corporation Commission as Bromide, later as Upper Simpson.

[7] Data not available.

Chart referred to filed with the committee.

PRESENT AND RECENT INSTANCES OF AVOIDABLE WASTE IN OIL AND GAS PRODUCTION

Prepared by Bureau of Mines, Department of the Interior

ARKANSAS

Observations in Arkansas fields have shown that natural gas is being blown to the air in the Schuler and Village fields of Union County and the Magnolia field of Columbia County; that there were high gas-oil ratios in the Lime pool of the Schuler field in 1937 and 1938 and in the Village field in 1939; that there is physical waste of crude oil in the "Old South" (El Dorado), Schuler and Urbana fields of Union County and the Smackover field of Ouachita and Union Counties; and that there has been serious waste of gas and depletion of reservoir energy in the Rodessa field, a part of which lies in Miller County, Ark. Conditions in these fields are discussed below:

Schuler field.—The first well in the Lime pool of the Schuler field was completed about October 1937 with a gas oil ratio of 35,000 cubic feet per barrel. In January 1938 the gas-oil ratio for the pool was 24,500 cubic feet per barrel but since June 1938 it has been from 700 to 900 cubic feet, which approximates the amount of gas dissolved in the oil under reservoir conditions.

Gas from some leases in the Schuler field is used in a refinery, but several million cubic feet of wet gas (gas with gasoline content) is burned every day. Recently 25 large flares were counted in one night in the field. One flare, burning an estimated 1,000,000 cubic feet of gas per day, is shown in figure 1. The roar of some of the flares can be heard from a distance of one-half mile.

In this field there is some loss of gasoline through bleeders on tanks and the ground is wet with light oil under bleeder outlets.

Village field.—This field, consisting of about 400 acres, developed in November 1939 by 11 wells, was discovered in May 1938. There are 8 large flares and no gasoline plants in the field. It is reported that about one-half of the gas produced in the field is taken by a pipe-line company, and the remainder is burned in the

Figure 1.—Night view 4-inch line torch, height of flame about 75 feet, Schuler Field.

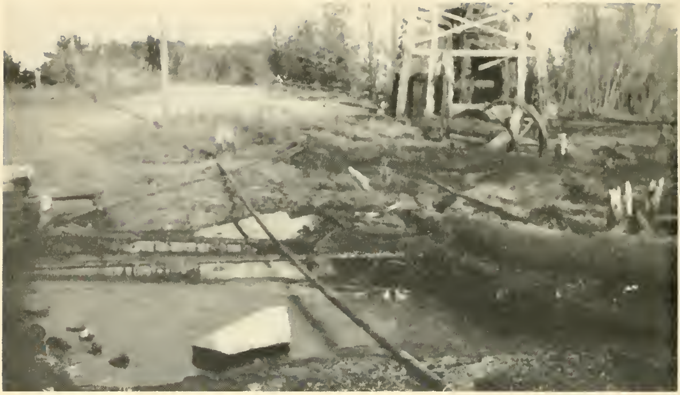

Figure 2.—Drainage pool at well, Old South Field.

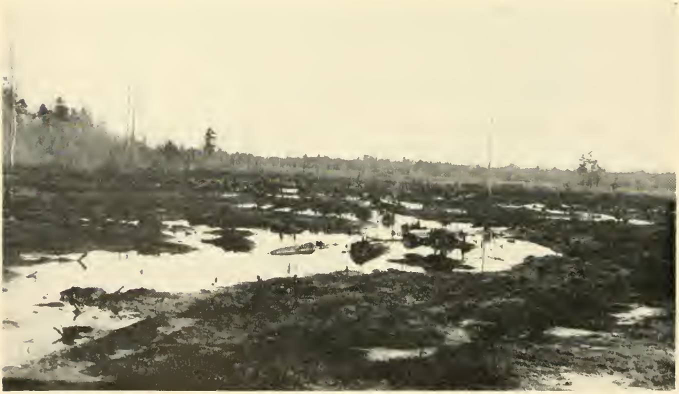

Figure 3.—Effect of aggregated well drainage into Bayou Loutre, Old South Field, 8 miles from source.

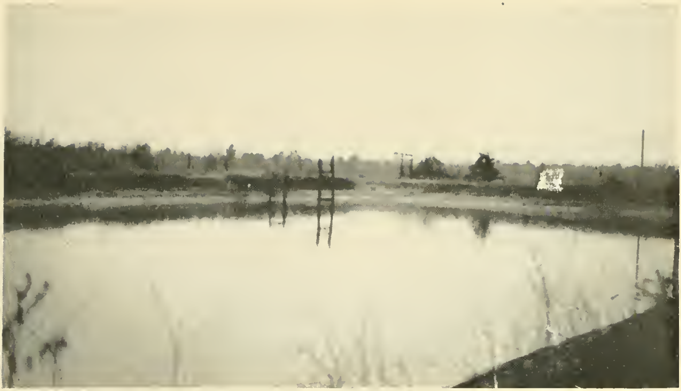

FIGURE 4.—Large B. S. pond, 350′ x 250′ x 15′ Urbana Field.

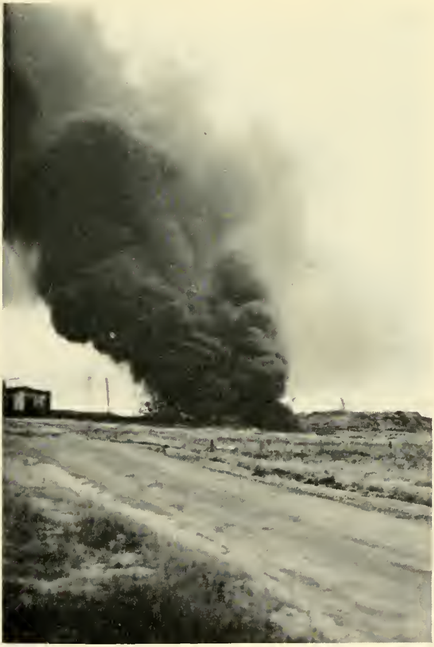

FIGURE 5.—Burning B. S. Pond, Smackover Field, Arkansas.

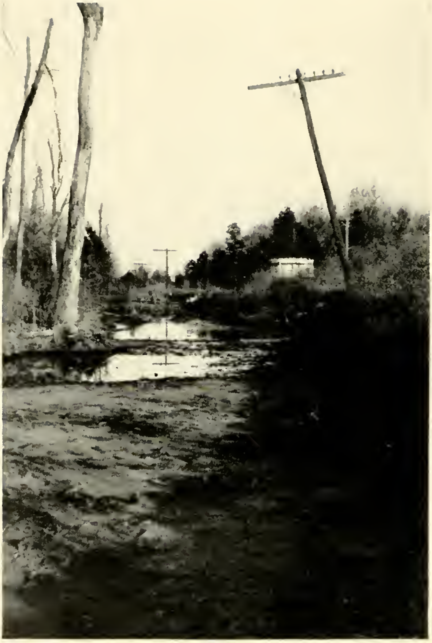

Figure 6.—Waste oil accumulations about 2 miles from the town of Smackover.

flares. The average gas-oil ratio was 11,400 cubic feet per barrel in January 1939, but by November it had been reduced to 6,500 cubic feet. Such gas-oil ratios cause rapid depletion of reservoir energy.

Magnolia field.—This field, with an estimated reserve of about 180,000,000 barrels of oil, is the most important discovery that has been made in Arkansas in recent years. The average gas-oil ratio increased from 700 cubic feet per barrel in March 1938 to 1,100 cubic feet in January and February 1939, but was reduced to 850 cubic feet in November 1939. The excess gas is vented to the air and the field contains many flares. A gasoline plant with a capacity of 15 to 20 million cubic feet of gas daily is expected to be completed and placed in operation about February 1, 1940.

"Old South" (El Dorado) field.—As this field is now about 19 years old there is little evidence of waste of gas, but there is loss of oil through untreated emulsions which escape into surface streams creating serious problems in pollution.

The emulsion from the tanks is burned or run to small ponds from which it is washed away during rainy weather. Also some oil is washed from the wells into natural drainage basins or bayous. This oil comes from leaky tanks or worn packing glands and is to be classed as dirty lease "housekeeping," at ypical example of which is shown in figure 2. That the harmful effects of such practices extend to areas distant from the producing area is indicated by figure 3, which shows a bayou 8 miles from the field. The devastation of plant life is apparent and the charred stumps and parts of trees indicate fire damage in the past.

Lease tanks in the "Old South" field usually are of steel but are not vaportight and as the oil has a gravity of about 33° A. P. I. and a gasoline content of approximately 25 percent there is loss by evaporation.

Urbana field.—This field produces a heavy oil deficient in light fractions and with little gas, so the principal waste is from emulsions and poor lease "housekeeping." Small B. S. ponds are sometimes burned, but is is reported that more often high water in rainy weather carries the emulsions into bayous or streams. Figure 4 shows a large pond about 350 feet long by 250 feet wide containing thick heavy oil to a depth of several feet.

Smackover field.—This field, discovered in 1922, has been the largest producing field in the State. The lease tanks are not vaportight and the usual methods of disposing of B. S. and emulsions is by burning in pits or by allowing the contents of the pits to escape during rainy weather. Figure 5 shows a burning B. S. pond and figure 6 shows oily waste accumulation along a roadside ditch about 2 miles from the town of Smackover. Such pools are numerous, and during high water many of them drain into Smackover Creek. The oil from this field is very heavy and deficient in light fractions, but the water produced with the oil has a temperature of about 140° F. so vaportight tanks would effect a saving of gasoline and naphtha content.

Arkansas portion of Rodessa field (Miller County).—As the greater part of the Rodessa field lies in Louisiana and Texas it will be discussed under those States. However, it seems appropriate to quote the following from the annual report for 1937 of the chief conservation agent of Arkansas:

> "The recent experiences in the Miller County field are ample proof of the folly of inefficient practices. The too rapid, unequal withdrawals in that field have brought about a premature decline in all the wells which has been appalling to the producers who have invested their money in the field, to the landowners, who have seen their opportunities dissipated, and those of us charged with guarding the interest of the State."

CALIFORNIA

There has been tremendous wastage of natural gas and dissipation of reservoir energy in the early lives of a number of prolific high-pressure oil fields in California. These recurrent conditions are largely the result of intensive competitive drilling, particularly in town-lot areas. Wasteful conditions now exist in the West Montebello field where excessive quantities of gas are being blown to the air, reservoir energy is being dissipated, wells have been closely spaced, and many unnecessary wells have been drilled. Wilmington is another oil field in which there has been and still is similar evidence of avoidable waste although the field now has passed the peak of natural gas production and gas wastage.

West Montebello field.—The West Montebello field is a new deep development west and south of the old Montebello field that has been producing since 1917. The upper part of a zone of the West Montebello field lying at a depth of more than 7,600 feet, discovered in April 1939, comprises an extensive gas cap. During that zone's early exploitation two spectacular blow-outs occurred and 15,000,000 cubic feet of gas per day with gas condensate was blow to the air from each well for several days under well pressures of 2,000 to 2,550 pounds per squre inch.

Initial production from all zones of the West Montebello field have ranged from 700 to 2,000 barrels of oil per day and gas-oil ratios have varied from 750 cubic feet per barrel in the upper zones to 6,000 in the lower zones. Production data including the average daily gas-oil ratios, gas blown to the air, and percentage of gas produced and wasted for the first 6 months of 1939 are given in the following table:

Oil and gas production data for West Montebello field for first 6 months of 1939

1939	Number of producing wells	Average daily oil production, barrels	Average daily gas production, thousand cubic feet	Average daily gas-oil ratio, cubic feet per barrel	Gas blown to air, daily average, thousand cubic feet	Percentage of gas wasted
January	35	8, 483	15, 456	1, 800	4, 784	31.0
February	41	7, 902	17, 220	2, 200	5, 514	32.0
March	46	8, 892	22, 685	2, 550	9, 912	43.7
April	51	9, 881	23, 838	2, 400	12, 906	54.0
May	54	11, 624	34, 079	2, 900	20, 874	61.3
June	58	14, 114	36, 816	2, 600	19, 109	52.0

Complete data for the last half of 1939 are not available, but the following records for certain periods during those 6 months have been obtained from reports filed under a court order:

Oil and gas production data, 1939, West Montebello field

Week ending—	Number of producing wells	Average daily oil production, barrels	Average daily gas production, thousand cubic feet	Average daily gas-gas-oil ratio, cubic feet per barrel	Gas blown to air, daily average, thousand cubic feet	Percentage of gas wasted
Oct. 22			67, 982		35, 486	52.0
Oct. 29			73, 908		39, 097	53.0
Nov. 6			73, 815		45, 503	62.0
Nov. 13			75, 171		46, 527	62.0
Nov. 20	136	23, 583	86, 935	3, 686	44, 544	47.3
Nov. 27	140	22, 540	88, 177	3, 912	47, 342	53.7
Dec. 4	144	21, 787	88, 876	4, 079	45, 910	51.7
Dec. 11	150	22, 614	95, 472	4, 222	53, 882	56.4
Dec. 18	156	22, 794	95, 799	4, 203	49, 500	51.7
Dec. 25	158	22, 090	97, 352	4, 408	46, 030	47.3

In May 1939 the wastage of gas from the West Montebello field reached an average of 20,874,000 cubic feet per day, or 647,094,000 cubic feet for the month. This was 61.3 percent of all gas produced. Production and volume of wastage continued to increase, and for the week ended December 25, 1939 the daily average gas production was 97,352,000 cubic feet, of which 46,030,000 cubic feet, of 47.3 percent, was blown to the air. An average of the figures for December indicates that the gas wastage in that month was about 1,500,000,000 cubic feet and constituted approximately 52 percent of the quantity of gas produced.

The average quantity of gas wasted daily from the field in December was equivalent in heating value to about 8,000 barrels of oil, or about 36 percent of the 22,000 barrels of oil per day produced from the field during the same period.

The average gas-oil ratio of the West Montebello field increased from 1,800 cubic feet per barrel in January 1939, to 4,408 cubic feet per barrel in the week ending December 25, 1939.

The West Montebello field was discovered early in January 1938, but the data on production and gas wastage for that field were not segregated from those for the old Montebello field until January 1939. The following table gives the production data for the entire Montebello area for 1938 and the first 6 months of 1939. Most of the gas blown to the air was from the West Montebello field.

Oil and gas production for Montebello field, including West Montebello

Date	Number of producing wells	Average daily oil production, barrels	Average daily gas production, thousand cubic feet	Average daily gas-oil ratio, cubic feet per barrel	Gas blown to air, daily average, thousand cubic feet	Percentage of gas wasted
1938						
January	204	8, 219	10, 892	1, 350	4, 931	40. 3
February	212	8, 511	12, 153	1, 450	699	5. 8
March	215	8, 152	10, 095	1, 250	468	4. 6
April	214	8, 550	9, 486	1, 100	1, 221	12. 9
May	216	10, 644	10, 220	950	3, 369	33. 0
June	217	11, 041	9, 424	850	1, 579	16. 8
July	209	10, 767	10, 529	1, 000	2, 995	28. 4
August	209	12, 827	13, 361	1, 050	4, 746	35. 5
September	210	12, 302	11, 974	975	2, 153	18. 0
October	209	14, 314	14, 989	1, 050	7, 052	47. 0
November	216	15, 550	19, 467	1, 250	10, 076	51. 8
December	216	15, 960	20, 481	1, 300	9, 135	44. 6
1939						
January	216	14, 514	20, 414	1, 400	5, 841	28. 6
February	223	13, 850	22, 198	1, 600	6, 467	29. 1
March	230	14, 995	27, 583	1, 850	11, 089	40. 2
April	231	15, 664	28, 306	1, 800	16, 815	59. 4
May	231	17, 293	37, 885	2, 200	21, 914	57. 8
June	238	20, 120	40, 467	2, 000	19, 818	49. 0

Complete data for the Montebello field for the last half of 1939 are not available, but the following table has been compiled from monthly reports published by the California Natural Gasoline Association. It is to be noted that the data in this table do not include gas blown to the air at wells, but most of the gas wasted to the air in the Montebello field is from natural gasoline plants:

Oil and gas production data, Montebello field, including Old Montebello and West Montebello fields

[Gas blown to the air at wells is not included]

Date	Average daily oil production, (barrels)	Average daily gas production, (thousand cubic feet)	Average daily gas-oil ratio, (cubic feet per barrel)	Gas blown to air, daily average (thousand cubic feet)	Percentage of gas wasted
1939:					
July	[1] 18, 609	29, 466	1, 583	15, 000	50. 9
August	23, 350	44, 693	1, 914	19, 518	43. 7
September	25, 726	53, 004	2, 060	28, 202	53. 2
October	26, 047	59, 057	1, 883	32, 480	55. 0
November	(2)				
December	(2)				

[1] American Petroleum Institute figures.
[2] Not published.

To curb the excessive waste of gas from the West Montebello field the division of oil and gas, Department of Natural Resources, of the State of California, acting under authority of a previously enacted gas conservation law [1] designed to prevent unreasonable waste of natural gas, obtained an injunction against several operators charging waste of natural resources. On the basis that the only practicable way to conserve the tremendous volume of gas that was being blown to the air was to limit oil production, court orders were issued temporarily stipulating 250 barrels per day as the maximum quantity of oil any well in the field could produce legally from the deep zones in the West Montebello field. Although the California gas conservation law has been upheld as constitutional and therefore cannot be rendered inoperative by injunction, operators may challenge in court the method and amount of restriction of production ordered by the department of natural resources. As a result of the court action, difficulties due to different interpretations of what constitutes "unreasonable" waste have been encountered in enforce ing the court's order.

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[1] Sec. 8 B, act of June 10, 1915, California Statutes.

According to the act, the State oil and gas supervisor has the power to determine (based on engineering facts) what constitutes unreasonable waste in specific instances and several years ago the division of oil and gas established two standards as bases for its interpretation of unreasonable waste. Where a large volume of gas is produced with the oil from a property or field, the gas allowed to be blown to the air was set by the supervisor at 10 percent of the total volume of gas produced; and where the volume of gas produced is small—a few hundred thousand to a million cubic feet per day—all of the gas produced may be blown to the air.

Following the injunction obtained by the State of California against West Montebello operators believed by the State oil and gas supervisor to be producing gas and blowing it to the air in such volume as to constitute unreasonable waste of a natural resource, the court appointed a committee of experts to observe potentials of West Montebello wells and submit a report outlining an equitable oil and gas curtailment program. The committee of engineers specified in its report that the maximum daily gas production from any well should not be greater than 5,000,000 cubic feet and established a formula for the gas allotment per well per day.

The following recommendations also were made by the committee:

1. Additional potential tests to be made every 90 days.
2. New wells to be tested within 3 days after completion.
3. No individual well potential exceeding 5,000,000 cubic feet daily to be used for calculating allowables.
4. Each well's potential to be reduced 10 percent each month between potential tests.

It is now (January 1940) mandatory for each operator in the West Montebello field to file a weekly report with the division of oil and gas showing quantity of oil produced, volume of wet formation gas produced, disposition of wet gas, volume of dry gas circulated, gas used in repressuring operations and as fuel, and the total volume of gas blown to the air.

Although the State has been successful in reducing gas production from this field below the potential capacity, it is evident that as a result of an increase in the number of producing wells, due to competitive drilling, gas production has increased steadily and gas wastage in December 1939 was double the quantity blown to the air in June 1939 and represented 50 percent of the production, despite the injunction against wastage that was in effect. According to the State division of oil and gas the daily volume of gas blown to the air in December 1939 in the Montebello field was two-thirds to three-fourths of the volume required to supply the normal daily consumption of the city of Los Angeles.

A problem that confronts the State of California in preventing "unreasonable" waste of gas produced with oil results from the transportation by utility companies of gas from other fields into consuming areas adjacent to oil and gas producing fields in which large volumes of gas are blown to the air because of the inability to obtain market outlets for the gas. In the West Montebello field, for example, a large percentage of the gas wasted is being blown to the air by operators who are unable to obtain gas contracts with the utility companies, while at the same time gas is being transported into the southern California area from dry gas fields and oil fields over 100 miles distant in the San Joaquin Valley and coastal districts. It would seem therefore that if excessive gas wastage is to be prevented in the early life of high-pressure oil fields in California the transportation of dry gas into areas where gas is being blown to the air must be controlled.

Wilmington field.—The Wilmington oil field in the Los Angeles Basin is one of the largest oil fields discovered in California. Active development began in December 1936 and at the end of 1937, 345 wells were completed indicating the rapidity of early developments. By the end of June 1939 the number of completions had increased to 669. Six producing zones have been penetrated in the Wilmington Harbor district at depths ranging from 2,200 to 5,600 feet.

The rapidity with which the town-lot sector of the field was drilled resulted in an extremely rapid decline in the rate of oil production. The decline in average daily production per well from June 4, 1937, to January 20, 1938, was 52 percent. With the discovery of the prolific Long Beach Harbor sector of the Wilmington field in January 1938 and subsequent well completions, there was a marked increase in production of oil from the field. As a result of the steady rise in the total output of oil from the field and in the daily average production per well, the oil umpire's efforts to curtail oil production by voluntary agreement of producers were greatly hampered. Accordingly a field committee was appointed by the umpire to assist in curbing drilling and production, and beginning March 1, 1938, oil production in the Long Beach area was curtailed voluntarily.

Although the Wilmington field has no high-pressure gas zones overlying the oil measures, large volumes of gas released from solution in the oil have been blown to the air—reaching a maximum of 33,888,000 cubic feet per day in July 1938 or 61.4 percent of the total gas produced. Most of the flowing wells yield a small volume of gas that increases with the rate of oil withdrawal. Wells in the upper zones produce 50,000 to 550,000 cubic feet per day and those in the lower zones produce 50,000 to 4,000,000 cubic feet per day. Data regarding the number of producing wells, oil and gas production, gas-oil ratios, and gas blown to the air for 1937, 1938, and the first 6 months of 1939 are given in the following table:

Oil and gas production data for Wilmington field

Year and month	Number of producing wells	Average daily oil production, barrels	Average daily gas production, thousand cubic feet	Average daily gas-oil ratio, cubic feet per barrel	Gas blown to air daily average, thousand cubic feet	Percentage of gas wasted
1937:						
January	18	1, 883	103	55	100	97. 0
February	20	4, 606	307	67	304	99. 0
March	39	8, 208	390	48	264	67. 7
April	71	21, 621	3, 269	150	2, 521	77. 0
May	107	39, 372	6, 095	155	4, 810	78. 9
June	146	41, 992	7, 163	170	4, 845	67. 6
July	203	48, 948	9, 307	190	6, 179	66. 4
August	246	53, 649	10, 359	190	2, 242	21. 6
September	278	58, 135	13, 073	225	1, 710	13. 1
October	297	60, 595	16, 780	275	1, 580	9. 4
November	317	60, 857	21, 541	350	3, 575	16. 6
December	345	62, 403	25, 441	410	4, 117	16. 2
1938:						
January	364	65, 775	26, 374	400	9, 274	35. 2
February	391	100, 770	41, 509	410	17, 630	42. 5
March	429	100, 607	45, 928	450	12, 935	28. 2
April	457	100, 130	47, 723	475	21, 742	45. 6
May	485	97, 931	54, 193	50	32, 840	33. 5
June	498	92, 163	50, 912	50	32, 381	63. 6
July	515	94, 284	55, 166	85	33, 888	61. 4
August	535	94, 416	58, 315	620	31, 639	54. 3
September	548	91, 989	59, 514	645	30, 270	50. 9
October	564	94, 019	62, 590	665	30, 704	49. 1
November	565	95, 761	66, 758	695	30, 488	45. 7
December	571	92, 370	67, 216	725	31, 679	47. 1
1939:						
January	594	83, 591	60, 719	725	22, 486	37. 0
February	609	83, 370	60, 303	725	15, 634	26. 0
March	620	85, 181	63, 266	743	19, 961	32. 0
April	634	88, 039	67, 466	765	18, 637	27. 6
May	652	89, 682	71, 139	795	16, 555	23. 3
June	669	80, 614	65, 849	815	15, 206	23. 1

The average daily gas-oil ratios, as may be noted in the table, have increased consistently with the age of the field to a maximum of only 815 cubic feet of gas per barrel of oil which may indicate that the oil in the reservoir originally was undersaturated with gas.

In 1938 the total volume of gas produced with the oil was 19,372,740,000 cubic feet of which 9,611,835,000 cubic feet, or 50 percent, was blown to the air. The gas wasted is equivalent in heating value to about 1,600,000 barrels of oil. Peak oil production was reached in February 1938 when the field produced approximately 101,000 barrels per day. The peak gas production, however, was not reached until May 1939 when the average daily production was 71,139,000 cubic feet. In June 1939, 15,206,000 cubic feet per day, or 23.1 percent of the gas produced, was blown to the air.

Other California fields in which there has been excessive waste of gas and unnecessary dissipation of reservoir energy in recent years

Other fields in California in which there has been excessive gas wastage in recent years are Mountain View, North Belridge, Dominguez, and Rosecrans. At present these fields are either past their period of flush production or their production is regulated so that only small quantities of gas now are being blown to the air. In them also there is now no excessive dissipation of reservoir energy. However, the following facts and figures for the periods of excess gas wastage in these fields are given as examples of conditions that reoccur from time to time with the discovery of prolific high-pressure fields in which gas is produced with oil.

Mountain View field.—Development of the Mountain View field began in May 1933. From September 1933 to May 1935 the control of development of the field and the spacing and production of wells was under the direction of the California oil umpire as a result of authority vested in him by the Federal Government through the National Industrial Recovery Act.

In the beginning the operators agreed upon a spacing program of 1 well to 10 acres and in developing the field the agreement was adhered to where conditions permitted. During the period of the Petroleum Code under the National Recovery Administration, curtailment of production was satisfactorily effective except for the months of January, February, and March, 1935, when one operator refused to cooperate and opened his wells, thus causing the neighboring operators to open their offsetting wells. This condition was subsequently rectified but when the National Industrial Recovery Act was declared unconstitutional several companies opened their wells to capacity and offset wells were opened accordingly. As a result, the daily average gas production for the field increased from 8,055,000 to 59,766,000 cubic feet between May and December 1935, and the volume of gas blown to the air daily increased from 2,399,000 to 43,878,000 cubic feet between May and November of the same year.

Average gas-oil ratios in the Mountain View field ranged from 1,500 to 2,500 cubic feet per barrel. In November 1935 the division of oil and gas, State of California, became concerned with the excessive waste of gas and an order was issued to all operators in the field to curtail gas production and to blow to the air not more than 10 percent of the amount of gas produced. This order, however, was ineffective in reducing waste of gas and an injunction to stop gas wastage was filed against the operators by the division of oil and gas. The suit was to come to trial in December 1935 but before then on the promise that the State would drop its suit if conditions were remedied the operators agreed on a voluntary curtailment limiting gas production to 45,000,000 cubic feet per day and promised to make efforts to increase the market for gas from the field to that figure. By March 1936 gas production was curtailed to 40,135,000 cubic feet per day and although efforts to increase the market for the gas did not develop an outlet for the desired quantity, substantial progress in disposing gas without waste was made and the State dropped its suit against the operators on March 31, 1936.

North Belridge field.—In 1932 high-pressure deep productive sands were discovered in the North Belridge field and the early wells drilled into these sands produced with high gas-oil ratios. In some wells the gas-oil ratio was over 33,000 cubic feet per barrel. As a result there was a large surplus of gas in the field and much of it was blown to the air. In 1935 the division of oil and gas of the department of natural resources instituted a suit to prevent this excessive waste of gas. However, in November 1935 the operators agreed to regulate oil and gas production voluntarily to reduce gas wastage and the suit was dropped by the State.

Excessive gas wastage was curtailed by: (1) Completion of wells having low gas-oil ratios and curtailing production of wells having high gas-oil ratios; (2) increased sale of gas to gas companies; (3) increased facilities for underground storage of gas; (4) increased facilities for handling wet gas in the field; (5) increased local use of gas, as in pipe-line pumping stations.

The following table gives oil production, gas production, gas-oil ratios, and gas blown to the air in the Belridge field in 1938.

Oil and gas production data on Belridge field, 1938

Month	Average daily oil production (barrels)	Average daily gas production (thousand cubic feet)	Gas-oil ratio, daily average (cubic feet per barrel)	Gas blown to air, daily average (thousand cubic feet)	Percentage of gas wasted
January	17, 133	149, 682	8, 736	9, 260	6. 2
February	16, 741	148, 238	8, 854	11, 312	7. 6
March	16, 609	141, 097	8, 495	20, 342	14. 4
April	17, 017	136, 157	8, 000	24, 629	18. 1
May	13, 304	114, 332	8, 594	14, 318	12. 5
June	13, 154	116, 260	8, 838	20, 958	18. 0
July	12, 635	96, 830	7, 664	16, 034	16. 6
August	12, 989	106, 963	8, 234	19, 059	17. 8
September	13, 672	103, 555	7, 574	12, 128	11. 7
October	13, 795	104, 698	7, 590	11, 283	10. 8
November	13, 633	112, 321	8, 239	7, 597	6. 8
December	14, 153	110, 315	7, 794	7, 462	6. 8

Dominguez and Rosecrans fields.—Discovery of deeper high-pressure zones in the Dominguez and Rosecrans fields in the Los Angeles Basin in 1938 led to excessive waste of gas from these fields. For several months during 1938, 15,000,000 cubic feet of gas per day was being blown to the air in the Dominguez field, representing about 30 percent of the total volume of gas being produced. Daily average gas-oil ratios during this period ranged from 1,800 to 2,200 cubic beer per barrel of oil.

Similar conditions existed in the Rosecrans field toward the end of 1938 and part of 1939, when 15,000,000 cubic feet or more of gas per day, representing 45 percent of the volume being produced, was blown to the air.

Gas-oil ratios in California fields.—Based on oil and gas production figures for 1938, as given in Petroleum Development and Technology [2] 1939, average gas-oil ratios of all important California fields have been computed and are given in the following table. It will be noted gas-oil ratios ranged from approximately 32,500 to 4,500 cubic feet per barrel in the Kettleman Hills Middle Dome, Belridge, Greeley, South Mountain, and Kettleman Hills North Dome fields.

Oil and gas production in California, 1938

Field and county	Oil production (barrels)	Gas production (million cubic feet)	Average gas-oil ratio
Los Angeles Basin:			
Rosecrans, Los Angeles	3, 731, 105	4, 861	1, 302
Brea Olinda, Los Angeles	2, 100, 038	1, 717	817
Coyote, Orange	4, 326, 798	3, 360	777
Dominguez, Los Angeles	9, 740, 197	19, 166	1, 968
El Segundo, Los Angeles	3, 877, 508	3, 478	897
Huntington Beach, Orange	11, 894, 880	14, 636	1, 230
Inglewood, Los Angeles	5, 335, 612	3, 344	627
Long Beach, Los Angeles	20, 485, 700	21, 993	1, 074
Montebello, Los Angeles	4, 174, 076	4, 159	997
Playa del Ray, Los Angeles	2, 267, 955	2, 179	961
Richfield, Orange	3, 134, 623	2, 605	831
Santa Fe Springs, Los Angeles	12. 614. 157	9, 922	787
Seal Beach, Los Angeles	2, 596, 214	3, 268	1, 258
Torrance, Los Angeles	5, 158, 751	3, 629	703
Wilmington, Los Angeles	34, 005, 738	14, 392	423
Coastal district:			
Capitan, Santa Barbara	1, 066, 533	688	645
Elwood, Santa Barbara	2, 247, 969	3, 430	1, 525
Rincon, Ventura	1, 394, 126	2, 058	1, 476
San Miguelito, Ventura	752, 781	1, 218	1, 618
Ventura Avenue, Ventura	12, 916, 832	36, 984	2, 863
South Mountain, Ventura	526, 568	3, 615	6, 865
San Joaquin Valley:			
Belridge, Kern	5, 246, 498	41, 579	7, 925
Coalinga, Fresno	3, 848, 817	20	5
Elk Hills, Kern	3, 877, 508	632	163
Greeley, Kern	1, 163, 723	8, 144	6, 998
Kettleman Hills:			
Middle, Kern	19, 273	628	32, 584
North, Kings, and Fresno	25, 587, 291	114, 624	4, 480
Midway-Maricopa, Kern	22, 864, 748	14, 479	633
Mountain View, Kern	3, 970, 954	3, 831	965
Rio Bravo, Kern	1, 944, 120	901	436
Ten Section, Kern	2, 472, 682	2, 900	1, 173

ILLINOIS

Physical waste of natural gas by blowing to the air

Observations in Illinois fields in December 1939 showed that gas was being blown to the air on leases in the Clay City (Clay and Wayne Counties), Centralia (Clinton and Marion Counties), Louden-Beecher City (Fayette County), Salem-Lake Centralia (Marion County), Sandoval (Marion County), Noble (Richland County), Keensburg (Wabash County), North Aden (Wayne County), and Storms (White County) fields; also from gasoline plants in the Louden-Beecher City and Salem-Lake Centralia fields. Figure 7 shows the burning of residue natural gas at a gasoline plant in the Louden-Beecher City area and figures 8 and 9 are night scenes showing flares of burning gas in the Salem-Lake Centralia field.

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[2] Wilhelm, V. H. Developments in California Oil Industry during 1938: Trans. Amer. Inst. Min. and Met. Eng., Petroleum Development and Technology 1939, pp. 252–257.

Discussions of conditions in individual fields follow.

Clay City field.—This field had 364 producing wells in November 1939, a large percentage of which are pumped by central powers. Gas produced with the oil is used locally for heating, treatment of oil, and generation of power used in oil operations, but some gas is burned in flares.

Centralia field.—This field had 552 producing wells in November 1939. As part of the development is within the city limits of Centralia, there was close spacing on city lots and one city block contains 9 producing wells.

Louden-Beecher City field.—This field had 1,290 producing wells in November 1939 and is estimated to contain 19,000 productive acres. A part of the gas produced with the oil is being returned to the producing formations after extraction of gasoline, but gas is burned in flares at gasoline plants (see fig. 7) and on leases.

Patoka field.—This field had 104 producing wells in November 1939. As a result of town-lot development there are more than 40 wells on one-quarter section of land.

Salem-Lake Centralia field.—The only gasoline plant in this field was processing about 17,000,000 cubic feet of gas daily in November 1939. Approximately 1,000,000 cubic feet of this gas was being returned to the formations and some of the remainder was used locally for heating, generation of power for oil operations, and treatment of oil, but much of it was released to the air and burned. Also much gas was burned in flares on leases. (See figs. 8 and 9.)

Numerous small leases within the limits of the field have led to close spacing, as shown in figures 10 and 11.

Sandoval field.—There are several gas flares in this field, which had 22 producing wells in November 1939.

Noble field.—In this field, with 207 producing wells in November 1939, some of the gas produced with the oil is used for heating, generation of power, and treatment of oil, and the excess is burned in flares.

Keensburg field.—In November 1939 when this field had 108 producing wells, of which 67 were within the city limits of Keensburg, flares were burning at individual tank batteries; also there were fire hazards within the town due to lack or inadquacy of dikes around tank batteries and proximity of flares to inflammable materials. Figure 12 shows close spacing within the city limits and figure 13 shows a flare burning within 30 feet of a crude-oil loading rack.

North Aden field.—Several gas flares are burning in this field having 60 wells in November 1939, although some gas is used locally.

Storms field.—In this newly discovered area with five producing wells (two of which were gas wells), seven drilling rigs, eight rigs standing, five rigging up, and six new locations on November 28, 1939, the gas from wells being tested or produced was being burned.

KANSAS

Court orders restraining the Kansas Corporation Commission from prorating the production of crude oil in the Hittle, Frog Hollow, Weathered Arbuckle, Weathered Lansing, K. C., and Weathered Mississippi pools of Cowley County and the Otis pool of Rush and Barton Counties are believed to have resulted in excessive oil production from these pools and in waste of gas in the Otis pool. Also in Kansas there has been wastage of gas from the Burrton field (Reno County), excessive use of cid has caused water encroachment in some parts of the State; physical tests to obtain well potentials has caused encroachment of water and waste of oil and gas in some areas; and there is waste and damage from abandoned wells that have not been plugged adequately. These instances of waste are discussed under headings that follow:

Restraining orders restricting proration by the Kansas Corporation Commission in the Hittle, Frog Hollow, Weathered Arbuckle, K. C., Weathered Mississippi and Otis pools

Article 7 of docket No. 14534, conservation division 39-12-1 of the Kansas State Corporation Commission for December 1939 reads:

"That temporary restraining orders have been issued by the District Court of Cowley County and the United States District Court for the District of Kansas, restraining the commission from restricting the production of crude oil below the respective amounts specified therein. The said orders are applicable to the Hittle, Frog Hollow, Weathered Arbuckle, Weathered Lansing, K. C., and Weathered Mississippi pools of Cowley County and the Otis pool of Rush and Barton Counties.

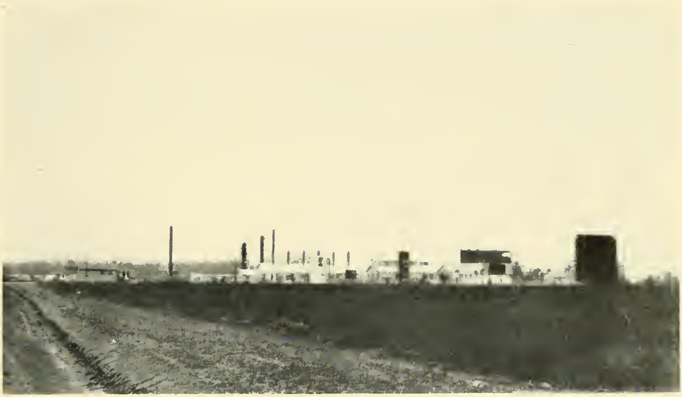
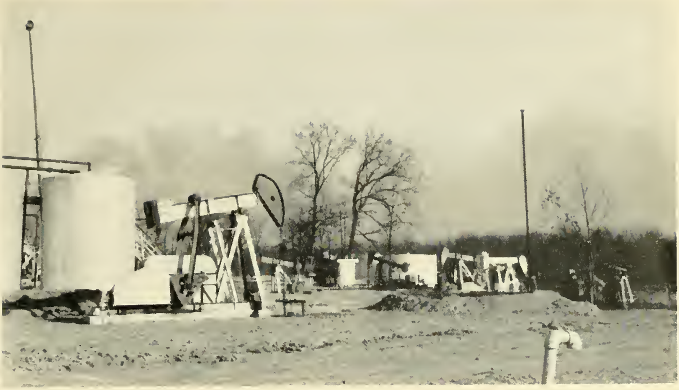
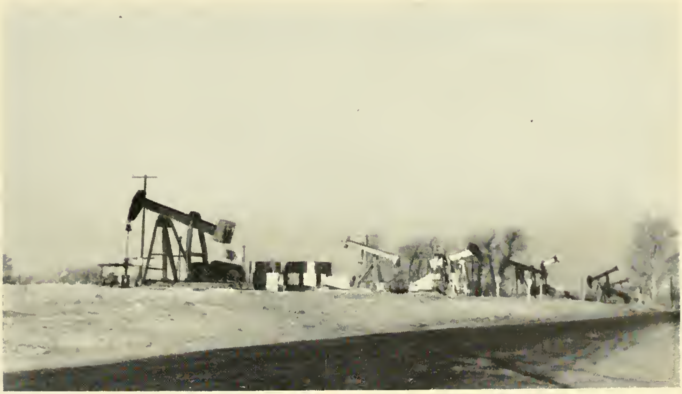


FIGURE 7.—Gasoline plant Louden-Beecher City area. Note burning residue gas at extreme right.

Figures 8 and 9.—Night scenes in Salem-Lake Centralia Field. Note large number of flares.





Figures 10 and 11.—Close spacing on odd property lots in Salem-Lake Centralia Fields.

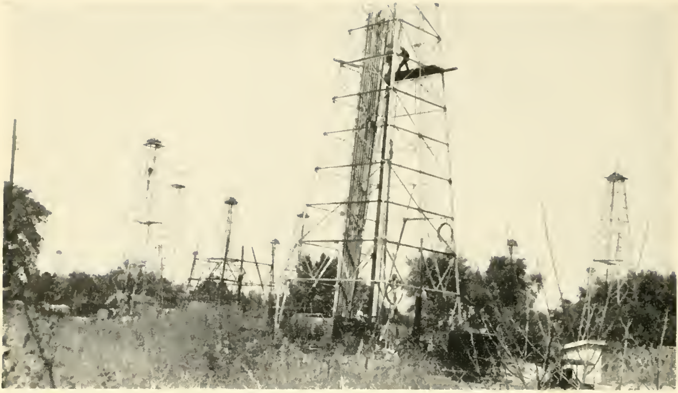


Figure 12.—Town lot drilling in Keensburg, Ill.

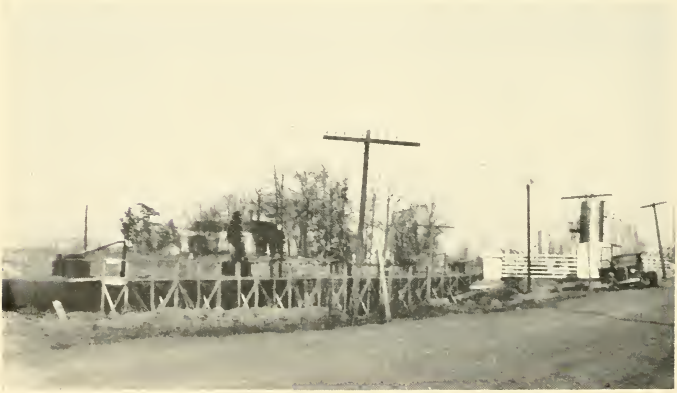


Figure 13.—Crude oil loading rack in Keensburg Field showing burning gas flare within 30 feet of filling tank cars.

"That in order to comply with the terms of said restraining orders, the commission is restricting the production of crude oil in such pool to the minimum amount specified in the restraining order relating thereto. However, the commission does not concede, and in fact denies, that the district court of Cowley County had or has any jurisdiction to make the restraining orders issued by it; the commission also denies that the restraining orders issued by the Federal Court for the Hittle and Otis pools were lawfully issued. It is hereby declared that, if any or all of said restraining orders are ultimately declared to be illegal or void, or otherwise dissolved, the commission will charge that portion of the production of each pool and well which is in excess of the normal pool allocation as heretofore and herein made against said pools and wells as overages and each and all of the same will be required to make up said overages from current allowables. That the allocations made under said restraining orders by the courts are not and shall not be considered to be the voluntary acts of the commission and it would, unless restrained, allocate to each of the said pools their normal allocation under the formula heretofore adopted to allocate production between pools to satisfy the daily consumptive demand. That, in view of the fact that the commission is restrained not only from enforcing its proration orders in the said pools, but from making orders restricting the amount of production below the levels established by the courts, it is impossible for the commission at this time to allocate production between such pools in the manner which it believes is fair and reasonable."

The October proration schedule of Kansas allowed the Hittle-Arbukcle formation of Cowley County a production of 67 percent of potential. Considering "underages" and "overages" as of September 1, 1939, this amounted to 26,944 barrels of production for the month of October 1939 when calculated from the pool's potential of 208,604 barrels per 24 hours. The December allowable granted by the restraining order was increased to 3.5633 percent of potential. Considering "underages" and "overages" this amounted to 243,748 barrels of production for the month of December 1939 as calculated from the potential of 218,765 barrels per 24 hours.

The 24-hour potentials, percent allowable, and production allowables of the fields affected by the court's restraining orders are shown below in tabular form for October, before the restraining orders were issued, and for December, after the restraining orders were effective.

Table showing comparison of "allowable" from fields affected by restraining orders for the months of October and December 1939 [1]

Field	Formation	October [2]			December [3]		
		Potential, 24 hours, barrel	Percent allowable	Allowable, barrel for month	Potential, 24 hours, barrel	Percent allowable	Allowable, barrel for month
Hittle	Arbuckle	208,604	0.67	25,944	218,765	3.5633	243,748
Weathered	do	24,858	2.23	11,324	24,858	4.00	31,737
Do	Lansing & K. C	227	9.91	524	227	30.00	2,437
Do	Mississippi	2,274	2.08	496	2,274	4.00	2,819
Frog Hollow		6,115	5.22	4,692	7,596	13.02	30,112
Otis		8,926	3.57	17,774	8,911	17.45	62,009

[1] Information from October 1939 and December 1939 taken from oil proration reports and orders by the Kansas State Corporation Commission.

[2] In accordance with regular State "allowables" based upon their regular method of allocating production.

[3] In accordance with restraining orders by the district and Federal courts.

It was reported on December 12, 1939, that the operators had cut their runs from the Hittle pool by 40 percent, due to pipe-line proration.

Otis field.—Based on a showing in court that there was a market for larger production from the Otis field an increased allowable was granted. Engineers of the corporation commission have reported that considerable gas was blown into the air during the period the Otis field was operated at the higher rate. When the commission ordered gas meters placed on all gas vents recently, the operators voluntarily shut down all wells except two and began repair work by squeeze cementing. The two oil wells not shut down are producing at low gas-oil ratios.

The outlet for gas from the Otis field has not been continuous and regular. Most of the oil wells were completed initially with high gas-oil ratios and considerable gas was blown to the air. The wells were equipped with packers to conserve gas after the commission set a maximum gas-oil ratios, but a proposal to build a gasoline plant and return residue gas to the formation has not materialzed in construction of the necessary facilities.

Wastage of gas from the Burrton field

The Burrton field, which was discovered and developed before gas conservation laws were passed in Kansas, has been a continual source of trouble. Numerous hearings before the corporation commission failed to develop means of eliminating the gas wastage prevalent for so long a time in this field. Considerable sums of money were spent to shut off the upper high-pressure gas horizon and thereby reduce the high gas-oil ratios of the early wells, but some operators did not shut off the gas and large volumes of gas were wasted.

Gas-conservation laws were passed later and maximum gas-oil ratios were set by the commission. The field now is nearly exhausted, and although some gas is still being vented to the air the quantity is much less than it was.

Encroachment of water as a result of excessive use of acid

Acid treatment of wells in limestone reservoirs makes the rocks more permeable and has been used advantageously to increase recovery of oil from old and nearly depleted oil fields. However, acid acts vertically as well as horizontally within the reservoir unless proper precautions are taken, and if acid is used in excessive quantities or without adequate control it may be harmful to the reservoir. Thus, although acid treatment of wells in limestone formations generally results in increased potentials and allowables, it may hasten water encroachment if proper care is not taken in its use, and it is believed that acid has been used excessively and without proper control in some areas in Kansas.

Water encroachment and waste resulting from physical tests

Most of the prolific, prorated pools of Kansas produce from the Arbuckle limestone which in many areas is underlain by a virtually inexhaustible supply of salt water; also the pay formation itself contains large quantities of connate water. The core specimens from the Arbuckle limestone have shown a wide range of oil and water saturation, and of horizontal and vertical permeability. In some areas the water content of the core in the main pay section of a field has been as high as 80 percent, and the vertical permeability has been several times the horizontal permeability. Records of the quantity of water produced at different rates of production show that in some wells there is a direct increase of water "cut" as the production rate is increased, but as the production rate is decreased the water "cut" does not decrease proportionately. This shows that as wells are produced at higher rates there is a possibility of bringing in salt water prematurely.

According to the rules in Kansas, operators may select the method of determining potential, either the physical test or the draw-down method. Heavy, expensive pumping equipment is necessary for taking potentials of large wells by the physical test. A maximum rate of about 3,700 barrels per 24 hours is possible by that method. Other wells are equipped with light pumping machinery, but this is large enough to make a satisfactory potential test by the draw-down method. The commission, however, does not recognize a well potential of greater than 3,000 barrels per day by the draw-down method although indications of potentials greater than 50,000 barrels per 24 hours have been noted.

The physical tests may cause waste within the reservoir resulting from water encroachment during the high rates of withdrawal. Also there are inequalities of allowables between operators because wells tested by the draw-down method are prorated from a maximum of 3,000 barrels per day potential whereas pumping wells subjected to the physical test may have a potential as high as 3,700 barrels per day.

Waste due to inadequate plugging of abandoned wells

In the course of a study in southeastern Kansas 11 abandoned wells were found to be flowing gas or salt water, and 5 were found to have fluid levels within 100 feet of the surface.

LOUISIANA

Recent and present instances of waste in northern Louisiana may be cited in the Rodessa field (Caddo Parish), where more than 200,000,000,000 cubic feet of natural gas has been blown to the air and reservoir energy has been depleted seriously, and in the Shreveport (Caddo Parish), Cotton Valley (Webster Parish), and Lisbon (Claiborne and Lincoln Parishes) fields where there have been instances of high gas-oil ratios and venting of gas. In the Louisiana Gulf Coast gas is being blown to the air from 50 out of 79 fields, and a number of fields have excessive gas-oil ratios. These conditions in Louisiana are discussed in more detail under headings that follow.

Rodessa field (*Caddo Parish*).—Parts of the Rodessa field lie in Texas and Arkansas, so this discussion deals only with the portion of the field in Caddo Parish, La. From discovery of oil in the Rodessa field in the summer of 1935 to September 1, 1939 the Caddo Parish part of the field produced about 58,000,000 barrels of oil out of a total reserve estimated at about 120,000,000 barrels.

During the early life of the field production was rapid, much gas was wasted, and reservoir energy was depleted seriously. In the last 6 months of the calendar year 1936 the bottom-hole pressure of the Dees-Young horizon was falling at the rate of about 2½ pounds per day. To the end of August 1939 the Louisiana part of the field had delivered about 220,000,000,000 cubic feet of gas to pipe lines, and it is believed that a somewhat larger quantity of gas was blown to the air. Thus the average gas-oil ratio from the discovery of the field to the end of August 1931, including both oil and gas wells, was about 7,600 cubic feet per barrel. The gas in solution in the oil under reservoir conditions is about 600 cubic feet per barrel.

In November 1939 the daily production of the Louisiana part of the field was about 22,000 barrels of oil, 132,000,000 cubic feet of gas delivered to pipe lines and 52,000,000 cubic feet of gas blown to the air. The over-all gas-oil ratio for both oil and gas wells, therefore, was about 8,400 cubic feet per barrel, but as approximately 105,000,000 cubic feet of the gas production was from gas wells, the average gas-oil ratio for the oil wells was about 3,600 cubic feet per barrel.

Shreveport field (*Caddo Parish*).—In this field, discovered in 1938, the permissible gas-oil ratio has been set by the department of conservation at 4,000 cubic feet per barrel, and wells with higher ratios are given a reduced allowable production. According to a schedule issued by the department of conservation in November 1939, gas-oil ratios of the wells ranged from 407 to 22,640 cubic feet per barrel and the oil allowables from 31 to 225 barrels per day.

It is reported that a large part of the gas produced with oil in the Shreveport field passes through a gasoline plant and that a part of the gas goes to pipe lines, some is used in drilling and operation, and the remainder is vented to the air.

Cotton Valley field (*Webster Parish*).—Gas-oil ratios of wells producing from the Holloway, Bodcaw, and "D" sands in this field ranged in November 1939 from 675 to 19,600 cubic feet per barrel, and the residue gas was being vented to the air.

Lisbon field (*Claiborne and Lincoln Parishes*).—The gas-oil ratios in this field (200 to 2,000 cubic feet per barrel) are not excessive, but the residue gas is vented to the air.

Fields of Louisiana Gulf coast.—Observations in southern Louisiana and a study of available records concerning 79 fields that produce virtually all the oil from that area have shown that:

1. Gas is being vented to the air in 50 of these fields.
2. In December 1939 in the 77 fields where gas recycling projects have not been installed, average gas-oil ratios were 2,000 cubic feet per barrel or more in 13 fields, 4,000 cubic feet per barrel or more in 6 fields, and ranged from 11,000 to 30,000 cubic feet per barrel in 4 of these fields.

Lake Arthur (sometimes called South Roanoke) in Jefferson Davis Parish, is an outstanding example of a field where large volumes of gas are being vented to the air. It was reported that this field with a daily allowable oil production of 1,223 barrels discharges approximately 13½ million cubic feet of gas to the air daily, giving an average gas-oil ratio of about 11,000 cubic feet per barrel. The six wells in this field, which produce "condensate" from a depth of approximately 9,900 feet, have unusually high surface and subsurface pressures. The bottom-hole pressure (estimated by extrapolating pressures taken at about 8,060 feet to the total depth) was reported to be 7,350 pounds per square inch, and the surface pressure was about 5,500 pounds per square inch. The normal bottom-hole pressure at 9,900 feet, based on hydrostatic pressure, is less than 5,000 pounds per square inch. The operating company has made preliminary tests to determine the pressures at which liquid appears with the gas for planning the construction of a recycling plant. It is reported, however, that equipment is not available for compressing the gas to the extreme pressures now necessary for recycling operations and that the operator desires to reduce the reservoir pressure to a pressure that can be handled by equipment obtainable for compressing the gas for recycling.

Other high-gas-oil-ratio fields in which considerable gas is blown to the air are: Abbeyville (Vermilion Parish), Bancroft (Beauregard Parish), De Large (Terrebonne Parish), Quarantine Bay (Plaquemines Parish), Roanoke (Jefferson Davis Parish), Vecherie (St. James Parish), and Woodlawn (Jefferson Davis Parish). Also considerable gas is blown to the air from several fields of low gas-oil ratio.

NEW MEXICO

Most of the present waste in New Mexico results from high gas-oil ratios and waste of gas in the fields of Lea County, which now produce nearly 90 percent of the State's output of oil, but there is some waste in Eddy County.

Lea County.—In September 1939 the 20 fields of Lea County were producing about 88,000 barrels of oil and 340,000,000 cubic feet of gas per day from 2,344 oil wells. Only about half of the gas produced is processed for removal of gasoline, and although authoritative data concerning the quantities of gas blown to the air and burned in flares are not available, a conservative estimate indicates that at least 200,000,000 cubic feet per day is wasted in this manner. Thus the gas production from these oil wells is nearly 4,000 cubic feet per barrel of oil produced and the gas wasted is more than 2,200 cubic feet for each barrel of oil.

In September 1939, 9 of the 20 fields of Lea County had average gas-oil ratios of more than 3,000 cubic feet of gas per barrel of oil and 3 of these had average ratios of more than 5,000 cubic feet per barrel. These 9 fields with their gas-oil ratios were as follows:

Field:	Gas-oil ratio, cubic feet per barrel	Field—Cont.	Gas-oil ratio, cubic feet per barrel
Cooper	12, 448	South Eunice	3, 908
Jal	7, 001	Langley	3, 723
Eunice	5, 653	Mattix	3, 386
Penrose	4, 876	Monument	3, 291
Eaves	4, 058		

Also in September 1939, 315 wells in 13 of the fields had gas-oil ratios exceeding 5,000 cubic feet per barrel. The records show that remedial measures have been undertaken in 340 wells, but these have not been uniformly successful, and in some wells gas-oil ratios have been higher following repairs than before they were undertaken. Undoubtedly gas-oil ratios can be reduced and reservoir energy conserved by further remedial work. Also in many wells repairs to reduce water production have given only temporary relief.

Some of the fields of Lea County are discussed under headings below:

Monument field.—This field was producing 21,430 barrels of oil per day with an average gas-oil ratio of 3,291 cubic feet per barrel in September 1939. In 1935 the ratio was 1,034 cubic feet per barrel. Of 491 wells in this field, 70 had gas-oil ratios of more than 5,000 cubic feet per barrel in September. Of these 70 wells, 32 had ratios of more than 8,000 and 14 had ratios of more than 20,000 cubic feet per barrel. The records show 115 "work-over" jobs but such remedial work has not been uniformly successful in controlling high gas-oil ratios.

Eunice field.—In September 1939 this field was producing 19,683 barrels of oil per day with an average gas-oil ratio of 5,653 cubic feet per barrel. In 1932 the ratio was 2,814 cubic feet per barrel. The records for September show 109 wells out of a total of 488 with gas-oil ratios above 5,000 cubic feet per barrel. Of these, 44 had ratios above 10,000 and 6 had ratios above 50,000 cubic feet per barrel. Remedial work in the Eunice field has not been as extensive as in the Monument and Hobbs fields as only 65 "work-over" jobs had been recorded to September 1939. It is evident that waste of gas and reservoir energy can be reduced in the Eunice field by repair programs.

Hobbs field.—This field was producing 19,390 barrels of oil per day with an average gas-oil ratio of 1,882 cubic feet per barrel in September 1939. The gas dissolved in the oil under reservoir conditions is about 660 cubic feet per barrel and the average gas-oil ratio of the wells in 1930 was 1,248 cubic feet per barrel. The water production has been increasing and in the first 9 months of 1939 was 806 barrels of water per 1,000 barrels of oil produced.

Although the average gas-oil ratio in the Hobbs field is lower than that in most of the fields of Lea County, 40 of the 252 wells in the field had gas-oil ratios in excess of 3,000 cubic feet per barrel in September 1939. Of these 40 wells, 16 had gas-oil ratios in excess of 5,000, 6 had ratios in excess of 8,000, and 1 had a ratio in excess of 10,000 cubic feet per barrel. The records show 81 remedial operations to September 1939, but these have not all been successful and attempted correction in some wells has increased the gas-oil ratio.

Cooper field.—In September 1939 this field was producing 4,282 barrels of oil per day with an average gas-oil ratio of 12,448 cubic feet per barrel of oil and a water-oil ratio of approximately 17 barrels per barrel. Of the 97 wells in the field, 20 had gas-oil ratios greater than 5,000 cubic feet per barrel.

Eddy County.—The Artesia, Grayburg, Jackson, Loco Hills, Maljamar, and other fields of Eddy County are producing from reservoir rocks that contain little or no free gas and many of the wells are pumped from the initial stages. However, there is waste through failure to extract natural gasoline from the casinghead gas produced in these fields and to put all the gas to useful purposes. The casinghead gas produced in Eddy County is estimated at 6,500,000 cubic feet per day, and all of this in excess of the quantities used in field operations is blown to the air or burned in flares.

OKLAHOMA

A review of conditions in Oklahoma shows that there has been waste due to rapid development and production in some of the more recently developed high-pressure fields, typified by the Oklahoma City field of Oklahoma County and the Moore field of Cleveland County; that there has been production from new wells at substantially open-flow capacity in areas of the State classed as "stripper" or "settled production" where wells are not prorated; and that there are wastes due to inefficient operating methods in areas of "stripper" production and fields where stimulative methods are being applied. These conditions are discussed under the headings that follow:

Oklahoma City field.—Because of rapid withdrawal of gas and resulting depletion of reservoir energy during the early period of operation, the Oklahoma City field (Oklahoma County) is approaching the final stages of natural production when approximately 60 percent of the original oil content of the Wilcox sand remains in the formation. Gas is now being injected in the south part of the Wilcox zone, and it is reported that some vacuum has been applied in the north end of the field. More extensive secondary methods, involving injection of gas (to be transported from other fields) into the upper parts of the Wilcox zone and water into the sands on the flanks of the structure, under unitized operation, are being considered. Recovery by natural methods could have been increased and application of costly secondary methods delayed by more conservative operations in the early life of the field.

Moore field.—Because of operation of wells in the Moore field (Cleveland County) at high rates and with high gas-oil ratios, the reservoir pressure has fallen from 3,300 pounds per square inch in June 1935 [3] to about 500 pounds per square inch in December 1939, and oil drawn into the gas cap has been lost through saturation of the sand in the gas zone; also water began to appear with the oil within 1½ years after development of the field started and in November 1939 (about 4½ years after production started) the field was producing about 2 barrels of water per barrel of oil. Although early estimates of the recoverable oil in the Moore field ranged from 20,000,000 to 50,000,000 barrels, present indications are that the total recovery by ordinary methods will be only about 10,000,000 barrels.

Records of a number of wells in the Moore pool show wide and erratic variations in gas-oil ratios (from well to well and from time to time in the same well) from 1,000 to 71,000 cubic feet per barrel. During the period from October 1937 to May 1939 (data for earlier and later periods have not been obtained) the average gas-oil ratio for the field varied from a minimum of 2,911 cubic feet per barrel in September 1938 to a maximum of 5,325 cubic feet per barrel in May 1939. The wells have had potentials as high as 35,000 barrels of oil per 24 hours and were given correspondingly high allowables.

In April 1937 the 22 wells then in the field produced at an average rate of about 665 barrels per day; in November 1939 the average for the 28 wells then producing was about 78 barrels per day.

Of the gas produced in the Moore field, some was used for gas lift and other operations in both the Oklahoma City and Moore fields, some was piped to gasoline plants in the Oklahoma City field where the gasoline was extracted, and some was blown to the air, but definite data concerning the relative quantities have not been obtained.

Statistical data for the Moore field are shown graphically in figure 14.

(Chart referred to filed with the committee.)

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[3] The original reservoir pressure has been reported as 2,840 pounds per square inch, but data which became available recently indicate that it must have been 3,300 pounds per square inch or higher.

Flush production in areas that are unprorated or classed as stripper

For the months from July to November, inclusive, 1939, a maximum production per well per day was placed on wells in the stripper areas of Oklahoma as follows:

Period	*Maximum production, barrels per well per day*	*Period*	*Maximum production, barrels per well per day*
July	100	September	65
Aug. 1–15	75	October	75
Aug. 16–31	[1]	November	75

[1] Shut down.

In other months of the calendar year 1939 no restrictions were placed on production of wells outside the class "A," "B," "C," and "D" prorated areas. That there is some flush production in areas not included under the "A," "B," "C," and "D" classifications is indicated by the following data concerning new wells.

Creek County.—In the Kellyville district two new wells in the Heyburn pool were reported to have initial productions of 1,000 and 554 barrels per day, respectively.

In the East Tuskegee area 5 wells completed in the West Nuyaka pool had initial productions ranging from 100 to 500 barrels daily, and a well northwest of that pool completed in March 1939 had an estimated initial production of 500 barrels per day and has produced 27,500 barrels.

Carter County.—New wells in the Sholem Alechem and Fox fields were reported to have initial productions of 291 and 249 barrels per day, respectively.

Lincoln County.—Several new wells in the Sac and Fox field are reported to have had initial productions ranging from 100 to more than 200 barrels per day, and one well to have an initial production of 406 barrels per day after shooting.

Two new wells in the Wilzetta area are reported to have had initial productions of 652 and 245 barrels per day, respectively.

In the Laffoon area, three new wells completed in the Wilcox sand are reported to have had initial productions ranging from 680 to 60 barrels per day.

Okfuskee County.—A well drilled west of the Weleetka field is reported to have had an initial flow of 244 barrels of oil and 6,000,000 cubic feet of gas per day.

Osage County.—A well in the Hickery Creek area was reported to have an initial production of 200 barrels per day from the Wayside sand at a depth of 950 feet, and several new locations were reported.

Wastes resulting from inefficient production practices in "stripper" areas

Nowata area, Nowata County.—An estimated 35 percent of the area of stripper production in the vicinity of Delaware, Nowata, Alluwe, and Chelsea is now being operated by water flooding. Many leases in this area previously were repressured with air or gas.

Operators of several of the flood properties have met with trouble because of improperly abandoned wells, the locations of which were not known because of lack of records. When pressure was applied to water-injection wells, water, oil, or both, appeared on the surface of the ground above or near unknown abandoned wells. Although this difficulty had its origin in faulty practices years ago, the waste is a present one. It is likely that this condition exists over a large area, but the rate of occurrence is declining because operators are making efforts to obtain old plugging records.

Chelsea area, Rogers County.—Emulsion difficulties are common in water-flood projects in this general area and methods of treatment vary with the ideas of each operator. These properties are old and often physical waste of oil occurs because of insufficient equipment or carelessness on the part of the operator.

For example, the operator of a lease in Rogers County, which has been under water flood for approximately 3 years, is having considerable difficulty with emulsions. A total of 15,000 barrels was produced during the month of July 1939 and the daily yield is now more than 150 barrels per day. The oil is emulsified considerably and is treated with a demulsifier before it enters the flow tank. The water effluent from the flow tank, which contains an appreciable quantity of oil, flows to an open pit (see fig. 15) where it is detained until the remaining emulsion is resolved by weathering and sunlight. The oil is then skimmed from the surface of the water and returned to storage. From 300 to 450 barrels of oil are skimmed from the pond each month (from 10 to 15 barrels per day). The

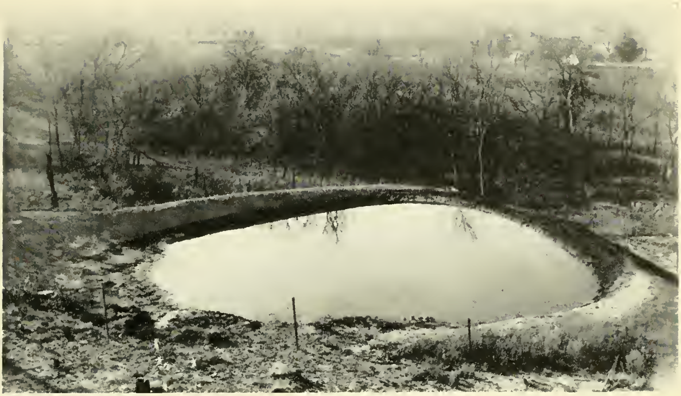

FIGURE 15.—Oil and water settling pit on lease in Rogers County. Pond is approximately 125 feet in diamater.

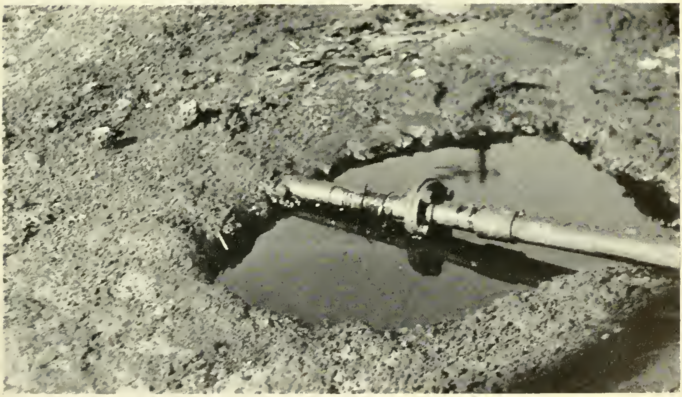

FIGURE 16.—Poorly repaired leak in lead line. Note pool of oil.

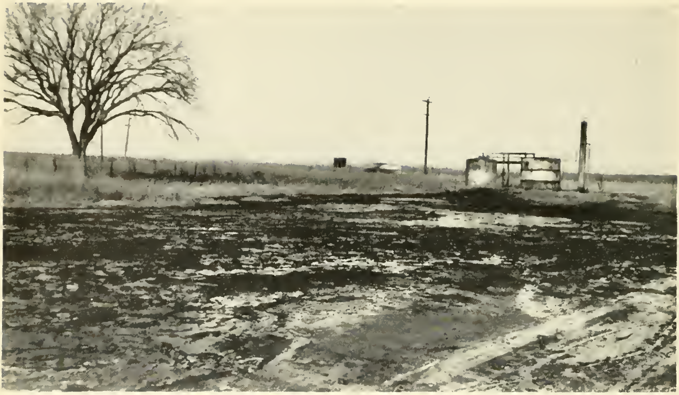

FIGURE 17.—Lease battery in Bird Creek Field, Oklahoma. Note oil waste covering ground at considerable distance from battery.

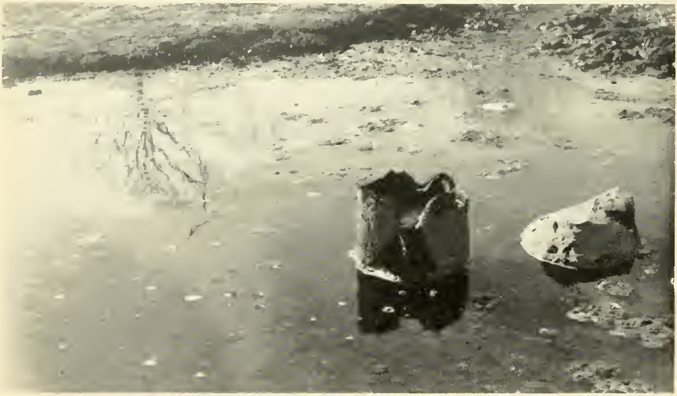

FIGURE 18.—Abandoned well near Broken Arrow. This well is flowing brine and gas bubbles may be seen near the casing.

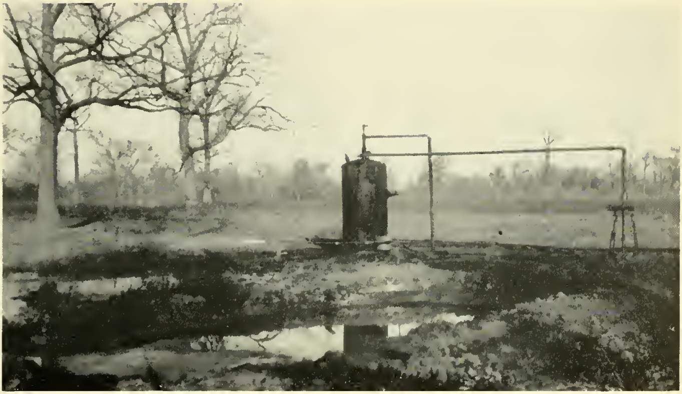

FIGURE 19.—Blowing gas well in Wagoner County.

gravity of the oil in the flow tank is 36° A. P. I., whereas that skimmed from the pond is 30° A. P. I. In addition to the loss of gravity, waste is incurred by loss of oil to the sandy soil of the pit by absorption and seepage.

Figure 16 shows a lease lead line improperly repaired, causing a pool of oil to collect which may be spread over the adjacent countryside following rains.

Bird Creek field, Tulsa County.—A lease in the Bird Creek field has 5 wells and produces 11 barrels per day from the Burgess sand at a depth of 1,200 to 1,300 feet. The gravity of the oil is 37° A. P. I. and although it is stored in open tanks, there is a slight increase in A. P. I. gravity on standing because of more complete resolution of the emulsion in the oil. Figure 17 shows the tank battery on this lease. The tanks are in poor condition as evidenced by the oil waste that has soaked the ground on the down-slope sides of the battery. The ground was saturated with oily waste to a depth of 5 inches at a distance of 200 feet from the tanks. Tank batteries of this type are not unusual on many of the older producing properties in eastern Oklahoma. Undoubtedly vaportight tanks painted light colors would effect material savings. The use of lease tanks having a capacity proportionate to the production of the property would reduce evaporation and other losses.

Broken Arrow area, Tulsa County.—An abandoned, unplugged well in the vicinity of Broken Arrow is a potential hazard to the surrounding area. The well has been flowing water for years and is still bubbling gas, as is shown in figure 18. The salt water contaminates surface streams in the locality, escape of the gas from the producing horizon lowers the reservoir pressure, and it is likely that this offending well may affect producing wells in that general area adversely.

Wagoner area, Wagoner County, Okla.—In Wagoner County, Okla., an old well was cleaned out to the gas shale at 900 feet. The well blew in with an estimated volume of 500,000 cubic feet of gas per 24 hours and with a "rock" pressure believed to be from 400 to 500 pounds per square inch. A packer (designed for 200 pounds per square inch) on the tubing could not hold the gas pressure so the well was allowed to blow through the tubing. The well had been blowing for 5 days and efforts were being made to mud it in at the time the occurrence was reported.

Another old well in Wagoner County, which had been abandoned and poorly plugged and over which cotton had been growing, blew in during the early winter of 1939. The well was cleaned out to the gas shale and a scrubber installed. The well has a rock pressure of 280 pounds per square inch and an estimated open flow of 200,000 cubic feet of gas per 24 hours. No pipe line was connected to the well, and it had been blowing to the air for more than two weeks at the time the picture shown in figure 19 was taken.

Muskogee Area, Muskogee County.—There are 10 wells near Muskogee, Okla., producing from depths of 1,400 and 1,800 feet. The avearge production per well is 3 barrels of 38° A. P. I. gravity oil per day. The oil is stored in non-vaportight tanks because the operators believe that evaporation losses are negligible as the oil stands in them no longer than one week. Vaportight tanks would prevent most of the loss attending this present practice.

Three wells in Muskogee County, Okla., drilled during the last year to the Viola lime at a depth of 2,000 feet are producing 95 barrels per day of 41° A. P. I. oil. This oil is heated to 130° F. to break the existing emulsion. During this treatment enough evaporation of light ends takes place to lower the gravity of the oil to 40° A. P. I.

A wasteful condition exists throughout the Muskogee area. The largest refinery in Muskogee was shut down because of labor troubles and small refiners operating in that area take only the oils of light gravity, refusing oils of heavy gravity. As a result several of the producers in the immediate vicinity of Muskogee have shut in their wells. It is claimed that many of these wells have been "drowned" with water and that heavy gravity or dark colored oil has been disposed of by dumping to make sufficient storage space for the better grade of oil that sometimes is produced on the same leases.

Creek County.—In the larger fields in Creek County, such as Glenn Pool and Cushing, there is no visible evidence of gas being burned or blown to the atmosphere. In fact, the larger part of the wells are operated under vacuum, the gasoline is extracted, and the residue gas is sold. However, throughout the county there are many small pools with only a few wells where flares are burned. These pools are isolated and according to local information the volume of gas is not sufficient to warrant either a gasoline plant or "booster station."

Okmulgee County.—Several burning gas flares have been noted in the vicinity of a small gasoline plant south of Beggs.

In the older fields in Okmulgee County, as in Creek and other counties previously discussed, lease "housekeeping" is poor and lease tanks are not vaportight and show evidence of leaks.

Waste attending desalting of crude petroleum

Within recent years the salt content of crude petroleum has become of major importance to many lease operations in Oklahoma (as well as in eastern Kansas). This problem is closely allied to the reduction of evaporation losses in that most desalting processes used on the leases require heat treatment. Losses result from evaporation of light gasoline during treatment and in storage, entrainment of oil in wash water or brine run to waste, "dumping" of insoluble oil, and shut-down of production. The greatest losses have been observed at field or well desalting units that originally were used only for breaking emulsions but now are operated as units in systems for extraction of salt. Although the desalting units in the new fields have been designed commercially and are considered to be vapor tight, those in old stripper-production areas are home made and gasoline vapor escapes readily. The only data for measuring these losses are the decreased volumes of the desalted oil. Data obtained from fields in northeastern Oklahoma (and adjacent areas in Kansas) showed that treating losses ranged from 1 to 5 percent for the first treatment and an additional loss occurred during retreating. Oils of 32° A. P. I. gravity lost from 1° to 3° of gravity during treatment.

Wash water or brine run to waste, from field desalters, carried entrained oil varying in amount from one-fourth barrel to 15 barrels per tank of 100 barrels capacity. Occasionally, oil from which the salt could not be removed economically was dumped.

Because of a maximum tolerance of 20 pounds of salt per 1,000 barrels of oil placed by purchasers on some production in Oklahoma, many wells were shut down pending treatment of stocks on hand to meet these specifications. The shut-down period on the leases under observation varied from 15 to 270 days with an estimated loss of the revenue from approximately 8,300 barrels (based upon previous production records). When pumping was resumed the production from many wells had decreased as much as 27 percent and this loss was not fully recovered after 7 months pumping; the total loss to date from this source was estimated to be 787 barrels.

TEXAS

A review of conditions in the State of Texas and study of available data regarding that State show that there is waste through operation of wells with excessive gas-oil ratios, failure to maintain reservoir pressure in "condensate" type fields, and blowing of gas to the air, and that there have been underground losses of oil due to faulty completion of wells and damage through water encroachment resulting from rapid early development. Such wastes and conditions from which they result are discussed under the headings that follow.

Excessive gas-oil ratios

According to data compiled by the Railroad Commission of Texas, 33 fields were found to contain wells that were being produced with gas-oil ratios in excess of those permitted by the commission.[4] In the following table a summary is given of data concerning these 33 fields as contained in the commission's proration schedules issued May 1, 1939.

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[4] The railroad commission has adopted rules and regulations for State-wide application of the Texas oil- and gas-conservation laws. Rule 6 states: "Effective December 15, 1933, no well producing both oil and gas shall be permitted to produce gas in excess of 2,000 cubic feet per barrel of oil produced unless specially authorized by an order of the Railroad Commission to vary therefrom. The gas-oil ratio shall be the relationship of the total volume of gas in cubic feet to the total volume of oil in barrels, produced from any specific well. Effective at once any well which by reason of its location or mode of completion is producing with a gas-oil ratio in excess of that authorized by the Railroad Commission of Texas shall be allowed to produce daily a total volume of gas equivalent to that of any other well producing from the same common source within the limits set by the Commission."

List of fields in which gas-oil ratios of certain wells exceed permitted gas-oil ratio as designated by Railroad Commission of Texas

[Compiled from railroad commission schedules issued May 1, 1939]

Railroad commission district number and name of field	County	Permitted gas-oil ratio, cubic feet per barrel	Total number of wells	Number of wells with gas-oil ratios higher than permitted ratio
3. Palacios	Matagorda	2,000	2	2
4. Aransas Pass	Aransas and San Patricio	10,000	192	60
4. Corpus Christi	Nueces	10,000	119	
4. Kohler	Duval	2,000	3	3
4. Saxet	Nueces	3,000	369	
4. New Saxet Frio	do	3,000	193	7
6. Cayuga	Anderson	5,000	253	25
6. Long Lake	do	10,000	75	13
6. Rodessa (Gloyd)	Cass	2,000	71	47
6. Rodessa (Jefferson)	Marion	2,000	139	26
6. Rodessa (Dees-Young)	Cass	3,500	275	96
8. North Cowden	Ector	3,500	241	19
8. Emperor	Winkler	2,000	75	8
8. Estes	Ward	2,000	301	79
8. Goldsmith	Ector	5,000	661	13
8. Foster	do	2,000	244	1
8. Fuhrman	Andrews	5,000	46	1
8. Jordon	Crane and Ector	2,000	105	1
8. Kermit	Winkler	3,000	891	218
8. Keystone (Lime)	do	8,000	69	5
8. Keystone (Colby sand)	do	3,000	85	5
8. Leck	do		8	1
8. Means	Andrews	2,000	81	17
8. Payton	Pecos and Ward	2,000	97	2
8. Pecos Valley (high gravity)	do	2,000	68	1
8. Sand Hills (permian)	Crane	2,000	26	5
8. Scarborough	Winkler	2,000	137	18
8. Sealey	do	3,000	24	9
8. Seminole	Gaines	3,000	12	1
8. North Ward	Ward	5,000	269	50
8. South Ward	do	5,000	689	108
8. Waddell	Crane	2,000	43	1
8. Wasson	Gaines and Yoakum	5,000	195	11

All of the 33 fields listed in the foregoing table are not regulated by rule 6 of the Texas Railroad Commission which establishes permissible gas-oil ratios. In prorating the oil and gas production from some of the fields a displacement factor is applied, which is based upon the space occupied in the reservoir by the oil and gas produced from a well.

All regulations of oil and gas production from flowing wells, whether by rule 6 (as given in footnote 4), "displacement factor", or otherwise, are designed to penalize wells of high gas-oil ratios and thereby restrict their gas production to a parity with that of wells producing at or below the permitted gas-oil ratio. Of the 33 fields summarized in the table, 18 had permitted gas-oil ratios in excess of 2,000 cubic feet per barrel, and 10 of the 18 had permitted gas-oil ratios of 5,000 cubic feet per barrel or more. In 3 of these fields the permitted ratio was 10,000 cubic feet per barrel.

Corpus Christi area, Nueces County.—Fields in the vicinity of Corpus Christi exemplify those in which operators are now making strenuous efforts to obtain gas to produce the remaining oil because of flagrant waste during early stages of development. Probably the oil was saturated or supersaturated in the reservoirs of these fields and gas caps or strata of free gas existed throughout the oil-bearing zones at the time the first wells were drilled, but the wells were produced with high gas-oil ratios, much gas was wasted to the air, and no attempt was made to recycle or repressure the fields. Lack of unit operation or agreement among the operators was a contributing reason of major importance for failure to return gas to the oil-bearing strata. Improper practices of development also resulted in several blow-outs and craters.

Loss of condensable hydrocarbons and other wastes in condensate-type fields

The extraction of condensable hydrocarbons from so-called condensate- or distillate-type fields of Texas depends on the maintenance of a reservoir pressure above the critical point at which retrograde condensation with decreasing pressure begins. In some fields of this type, maximum recovery has not been attained, and it is possible that waste of reservoir energy may exist in some of these fields although the volume of gas vented to the atmosphere may be relatively small.

La Blanca field, Hidalgo County.—The importance of recycling residue gas under high pressure has been illustrated by Patten and Ivey [5] in a study of La Blanca field, Hidalgo County, which had an original reservoir pressure of about 4,200 pounds per square inch. Those investigators estimated that approximately 65 percent of the liquid content of the gas at a pressure of 3,800 pounds per square inch will condense and remain behind in La Blanca field because of failure to maintain the pressure at that value. The pressure in the reservoir at La Blanca was 2,180 pounds per square inch in the latter part of the year 1938. Figure 20 graphically illustrates the composition of hydrocarbons in the natural reservoir of that field at various pressures.

(Chart referred to filed with the committee.)

Old Ocean field, Brazoria County.—Oil is found in this field at an approximate depth of 9,900 feet and drilling costs are reported to be $150,000 per well. The gas-oil ratio of one well was 14,000 cubic feet per barrel at completion and probably has not decreased. The wells in this field have been permitted to produce with very high gas-oil ratios for some time. The oil is about 54° A. P. I. An injection program was instituted and an attempt made to return some of the gas to the reservoir, but that operation has been postponed until the pressure is reduced to the range that can be handled by custom-built compressors. The hydrocarbons doubtlessly are in the gaseous phase in the reservoir. If this field is permitted to produce until the reservoir pressure is below the point at which retrograde condensation takes place, a large quantity of hydrocarbons will condense in the sandstone and be lost. A recycling program using heavy-duty compressors likely would prevent the underground waste of condensable hydrocarbons taking place in this field.

La Belle field, Jefferson County.—Waste of gas in this field is from one well, completed in April 1938 at a total depth of 8,632 feet. Because of failure of well-head fittings, the well got out of control, and on May 27, 1938, the daily production through the drill pipe was 937 barrels of oil and 79,000,000 cubic feet of gas—a ratio of 84,300 cubic feet per barrel of oil. On October 4, 1938, 6 months after the "blow-out," the daily production (still using the expedient well-head connections) was 720 barrels of oil and 70,000,000 cubic feet of gas—a ratio of 97,000 cubic feet per barrel of oil. Some remedial work has been done on the connections, and the flow has been restricted to about 60,000,000 cubic feet per day, but much of the hydrocarbon liquid in the reservoir is being lost.

Grapeland field, Houston County.—Development in the Grapeland field includes 11 wells that are productive from a zone in the Woodbine formation about 6,000 feet below the surface of the ground. Ten of the wells are classified as gas wells and one as an oil well.[6]

The rate of production from the oil well in December 1939 was about 84 barrels of crude oil per 24 hours with a gas-oil ratio of about 15,000 cubic feet of gas per barrel of crude oil. There is no gas pipe line in the field at present. Three of the gas wells are operated in a recycling project, and 7 of the gas wells are now "closed-in," although 1 or more additional recycling projects are being considered.

In the recycling operations now in progress about 16,500,000 cubic feet of gas per 24 hours is produced from 2 wells, from which about 456 barrels of hydrocarbon liquid is recovered. The residual gas phase of the fluid is returned to the reservoir through the third well, used as an injection well. However, in November and December 1939, analyses of the fluid obtained from 4 of the inoperative wells—that had similar producing characteristics and recoverable liquid components—indicated that the total recoverable hydrocarbon liquid content of the reservoir fluid was about 50 barrels per million cubic feet of gas. On this basis solely, only about 55 percent of the total recoverable hydrocarbon liquid was being extracted by the method of operation in effect at the time the analyses of reservoir fluid were made.

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[5] Patten, F. V. L., and Ivey, Denny C., Phase Equilibria in High Pressure Condensate Wells; Oil Weekly Dec. 12, 1938, pp. 20–32.

[6] Texas oil and gas conservation law:

"ART. 6008 (7849).

"SEC. 2 (d). A 'gas well' is any well (a) which produces natural gas not associated or blended with crude petroleum oil at the time of production, or (b) which produces more than 100,000 cubic feet of natural gas to each barrel of crude petroleum oil from the same producing horizon, or (c) which produces natural gas from a formation or producing horizon productive of gas only encountered in a well-bore through which crude petroleum oil also is produced through the inside of another string of casing.

"(e) The term 'oil well' is any well which produces one barrel or more of crude petroleum oil to each 100,000 cubic feet of natural gas.

"(f) 'Dry gas' is any natural gas produced from a stratum that does not produce crude petroleum oil."

Long Lake field, Anderson, Freestone, and Leon Counties.—There were 72 oil wells and 42 gas wells in the Long Lake field at the beginning of 1939. The wells are productive from a reservoir in the Woodbine formation about 5,300 feet below the surface of the ground. The maximum crude oil "allowable" for the wells classified as oil wells was 46 barrels per well per 24 hours in 1938 and 1939. The maximum rate of gas withdrawal from the oil wells was established as 460,000 cubic feet per 24 hours per well based on a maximum gas-oil ratio of 10,000 cubic feet per barrel of oil. Rates of oil recovery from wells having gas-oil ratios that exceeded 10,000 cubic feet per barrel of oil were restricted to that recovered with the maximum allowable rate of gas production per well of 460,000 cubic feet per 24 hours. However, it was estimated that the actual gas withdrawal incident to an oil recovery of approximately 1,594,600 barrels in 1938 was about 5,250,000,000 cubic feet, or 3,300 cubic feet of gas per barrel of oil. About 1,250,000,000 cubic feet of the gas produced from oil wells was utilized for fuel in lease operations and delivered to a pipe line, and it was estimated that the volume of the gas vented to the atmosphere was about 4,000,000,000 cubic feet, or approximately 2,500 cubic feet per barrel of oil recovered in 1938.

It was reported that about 333,500 barrels of hydrocarbon liquid were recovered from the gas wells in the course of a withdrawal of about 6,800,000,000 cubic feet of gas in 1938. The volume of gas vented to the atmosphere from gas wells was small. About 2,000,000,000 cubic feet of the volume of gas produced from gas wells was returned to the reservoir by recycling operations, and the remainder delivered to pipe lines to supply demands for domestic and industrial fuel and utilized for fuel in the field for lease operations and development.

Recycling operations in the Long Lake field were increased during 1939, and at present 3 projects are operative that return about 750,000,000 cubic feet of residual gas to the reservoir per 24 hours.

Cayuga field, Anderson, Freestone, and Henderson Counties.—The Cayuga field includes 2 productive reservoirs. Development of the upper reservoir (in the Woodbine formation) at the beginning of 1939 included 250 oil wells and 34 gas wells which were completed at an average depth of about 4,100 feet below the surface of the ground. Development of the lower reservoir at the beginning of 1939 included 4 wells that were completed in the Trinity formation at an average depth of about 7,500 feet below the surface of the ground. Three of the wells were classified as gas wells. Information regarding the classification of the fourth well is not available.

The maximum crude oil and gas-oil ratio allowables from oil wells in the Woodbine Reservoir in 1938 and 1939 were 104 barrels per well per 24 hours, and 5,000 cubic feet of gas per barrel of oil. It was reported that 3,120,000 barrels of oil were produced from oil wells in the Woodbine Reservoir in 1938. It was estimated that the volume of gas produced with the oil was about 8,700,000,000 cubic feet (about 2,800 cubic feet per barrel), and that about 70 percent of the total volume of the gas produced, or 6,000,000,000 cubic feet, was vented to the atmosphere.

The volume of gas produced from gas wells productive from the Woodbine Reservoir in 1938 was about 6,800,000,000 cubic feet; approximately 2,500,000,000 cubic feet of this was returned to the Woodbine Reservoir and the remainder delivered to pipe lines and used locally for fuel. The volume of hydrocarbon liquid recovered from the gas produced from gas wells in the Woodbine Reservoir in 1938 was about 105,000 barrels.

The volume of gas produced in 1938 from the gas wells in the Trinity Reservoir was approximately 3,700,000,000 cubic feet; about 2,400,000,000 cubic feet of this was returned to the Woodbine Reservoir and the remainder delivered to a pipe line or used locally for fuel. The volume of hydrocarbon liquid recovered from the gas produced from the Trinity Reservoir in 1938 was about 147,000 barrels.

Underground loss of oil

Although the initial occurrence took place more than 10 years ago, as described in Bureau of Mines Report of Investigations 3316, page 116 (published in November 1936), the seepage of oil in the Yates field is an outstanding example of waste due to improper casing and cementing in the early life of a field. More than 3,000,000 barrels of oil had been recovered through salvage operations along the Pecos River to July 1933, and remedial measures were taken, but an untold quantity was lost in porous, barren formations before the seepage oil appeared at the surface. The ultimate recovery from the field has been reduced by an irrevocable loss from the main producing zone.

Loss through water encroachment

When reservoirs under hydraulic control are developed too rapidly there is danger of premature water encroachment and "water coning" which may result in the entrapment and loss of oil and an increase in operating expense. This is not as likely to occur in limestone reservoirs as in sandstone reservoirs. However, the Hendrick field in Winkler County, Tex., a limestone reservoir, is an example of a field in which the withdrawal was rapid and large volumes of water appeared early in the life of the field, causing high costs of operation.

Waste of gas in Panhandle of Texas

In considering waste of reservoir energy caused by dissipation of free natural gas, special consideration must be given to the 36 oil pools situated in the main Panhandle structure in Texas and comprising the major part of that productive area as now defined. In these fields, large natural-gas pipe lines obtain supplies for transmission to distant markets.

According to the Railroad Commission of Texas Annual Report on the Panhandle Field, July 1938, 715 oil wells of a total of 3,419 wells reported in April 1938 had gas-oil ratios ranging from 5,000 to 100,000 cubic feet per barrel. If efficient use is made of the gas in lifting the oil, none of the wells in the oil fields of the Panhandle of Texas require as much as 5,000 cubic feet of gas to produce a barrel of oil. Therefore, the oil wells mentioned above are wasteful, if considered strictly from the reservoir-energy viewpoint.

Little remedial work has been done in the Panhandle field to correct wells having high gas-oil ratios.[7] The claim is made that difficult paraffin conditions prevent such remedial work. The areas containing the largest number of wells being produced with high gas-oil ratios are in the southernmost line of fields in Carson and Gray Counties where the "granite wash" wedges out toward the buried granite ridge.

The railroad commission report shows that during the fiscal year ended June 30, 1938, over 12,000,000,000 cubic feet of gas was blown to the air in the Texas Panhandle. Also, in July 1938, the approximate daily average production of natural gas in the area was 1,520,000,000 cubic feet, and during the first 7 months of the calendar year 1938, the average daily quantity of gas blown to the air was 37,518,000 cubic feet, or approximately 2 precent of the total quantity of gas produced during those months. Most of this waste results from the fact that various units in the field are unable to keep in step at all times. If carbon-black plants have a partial shut-down or fuel demands drop off before the production departments have made their daily oil "allowables," the natural-gasoline plants are forced to waste residue casinghead gas to the air following the processing for gasoline extraction. Conditions have not changed in any major respect from what they were when the commission's report was written. The following table summarizes available data on gas-wastage conditions in the Texas Panhandle for the past several years.

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[7] These wells are not to be confused with many wells drilled in the early life of the field (especially in the Borger area) suspected of losing oil and gas because of improper completion practices. Most of these old wells have been abandoned or converted into gas wells by "plugging back." The early wasteful practice has caused a continuing problem, involving a choice between (1) "plugging-back" operations to obtain gas wells which will leave the oil in the underground strata, and (2) recovery of as much of the remaining oil as possible through production practices requiring high gas-oil ratios.

Sweet, sour, casinghead, and total natural-gas production, utilization, and wastage in the Texas Panhandle oil and gas field

Year	Natural-gas production, 1,000 cubic feet					
	Sweet			Sour	Cashinghead	Total
	East field	West field	Total			
1935 (last half) [1]	43, 701, 290	103, 125, 555	146, 826, 845	63, 070, 053	68, 465, 650	278, 362, 548
1936 [1]	43, 383, 450	231, 044, 684	274, 428, 134	170, 649, 091	152, 352, 702	597, 429, 927
1937 [2]	41, 272, 571	236, 725, 209	277, 997, 780	222, 638, 166	135, 865, 107	636, 501, 053
1938 [2]	40, 214, 563	230, 292, 936	270, 507, 499	221, 979, 183	114, 434, 288	606, 920, 970

Year	Utilization, 1,000 cubic feet				Wastage	
	Extraction loss	Plant lease and other use	Manufacture of carbon black	Delivered to pipe lines	1,000 cubic feet	Percentage of gas produced
1935 (last half) [1]	12, 193, 982	35, 723, 662	81, 785, 734	63, 057, 516	85, 601, 654	30. 8
1936 [1]	23, 021, 964	83, 905, 538	223, 432, 855	202, 291, 255	64, 778, 315	10. 8
1937 [2]	24, 256, 526	72, 252, 871	288, 409, 978	234, 736, 498	16, 853, 550	2. 6
1938 [2]	22, 269, 391	66, 227, 873	268, 479, 209	235, 040, 862	13, 636, 010	2. 2

[1] Compiled from data given in oil and gas division, Railroad Commission of Texas, annual report on the Texas Panhandle oil and gas field, Austin, Tex., August 1937.

[2] Data furnished by the Railroad Commission of Texas.

Gas wastage in Texas

An over-all picture of relatively recent gas history of the State of Texas may be gained from figures based upon data compiled by railroad commission engineers, as given in the following tabulation:

Ultimate distribution of gas produced in Texas [1]

	Total monthly gas production, thousands cubic feet	Total daily gas production, thousands cubic feet	Monthly gas production vented to air		Gas used for repressuring and recycling	
			Thousands cubic feet	Percent	Thousands cubic feet	Percent
December 1936	76, 903, 000	2, 487, 000	6, 747, 000	8. 8	978, 000	1. 3
December 1937	94, 610, 000	3, 052, 000	7, 509, 000	7. 9	2, 139, 000	2. 3
December 1938	104, 967, 000	3, 386, 000	11, 216, 000	10. 7	4, 395, 000	4. 2
June 1939 [2]	99, 085, 000	3, 302, 840	11, 535, 000	11. 6	11, 183, 000	11. 3

[1] Railroad Commission of Texas, Gas Statistical Report, 1936, 1937, 1938, p. 4.

[2] Calculated from data compiled by engineering department, Railroad Commission of Texas, and contained in Monthly Summary of Natural and Casinghead Production, June 1939.

Other statistical material compiled by the Railroad Commission of Texas for natural gas produced in the State for the years 1936, 1937, and 1938 shows that the volumes produced during the 3-year period increased from 844,738,000,000 cubic feet in 1936 to 1,099,678,000,000 cubic feet in 1938, the last year for which annual figures are available. Of these amounts the portion vented to the air was as follows:

	Percent
1936	11. 94
1937	9. 19
1938	12. 48

Monthly records of the Railroad Commission for the first 10 months of the calendar year 1939 show that for January there were 3,201 wells in the State producing dry natural gas and 446 gas wells that also produced oil or condensate. Of these wells, 1,477 or 40.5 percent were connected to plants. The average daily production for the month was 2,353,893,000 cubic feet, of which 1,348,805,000 cubic feet or 57.3 percent was delivered to gasoline plants and there processed for natural gasoline recovery. Corresponding data for October 1939 are as follows: Producing gas wells—3,250 and 459 additional gas wells producing oil or condensate. Of these wells 39.44 percent were connected to gasoline plants, and of the daily production of 2,603,797,000 cubic feet, 1,373,811,000 cubic feet daily or 52.76 percent of the dry gas produced was processed by gasoline plants. Monthly data on dry gas production for the first 10 months are listed in the following table.

Dry gas production in Texas, 1939

Month	Number of gas wells	Gas wells producing oil or condensate	Gas wells connected to plants	Daily volume produced, thousand cubic feet	Dry gas to gasoline plants	Percentage gas processed
January	3, 201	446	1, 477	2, 353, 893	1, 348, 805	57. 3
February	3, 214	454	1, 459	2, 377, 020	1, 367, 301	57. 50
March	3, 206	410	1, 470	2, 264, 205	1, 316, 993	58. 17
April	3, 207	445	1, 479	2, 265, 767	1, 322, 534	58. 37
May	3, 182	449	1, 443	2, 096, 025	1, 233, 661	58. 86
June	3, 244	441	1, 395	2, 138, 706	1, 235, 600	57. 77
July	3, 259	438	1, 418	2, 227, 502	1, 244, 638	55. 88
August	3, 266	426	1, 493	2, 112, 249	1, 283, 980	60. 79
September	3, 168	412	1, 395	2, 363, 515	1, 283, 774	54. 32
October	3, 250	459	1, 463	2, 603, 797	1, 373, 811	52. 76

Records of casinghead gas show that out of a total of 85,838 oil wells in the State in January 1939, 40,414 or 47.08 percent of the wells were connected to gasoline plants, and of the total of 1,046,316,000 cubic feet of casinghead gas produced daily, 965,864,000 cubic feet, 92.31 percent, was processed by gasoline plants. In October 1939, the corresponding data were: 42,190 or 47.5 percent of the 88,812 oil wells in the State were connected to gasoline plants and of the 1,264,659,000 cubic feet daily production reported, 1,108,645,000 cubic feet, 87.66 percent, was processed in gasoline plants. In January 1939 there were 149 gasoline plants and 35 carbon plants operating in the State, whereas in October the number of operating plants was 148 gasoline plants, 20 repressuring and recycling plants and 38 carbon-black plants. Records for January 1939 also show that the total gas—dry and casinghead gas combined—processed daily was 3,408,867,000 cubic feet and that 369,064,000 cubic feet, or 10.82 percent of the residue gas was vented to the air daily. Corresponding data for October 1939 show that the total volume processed daily was 3,876,709,000 cubic feet and that 387,425,000 cubic feet or 9.99 percent of the residue gas was vented to the air. Monthly data on casinghead gas produced during the first 10 months of 1939 that was delivered to gasoline plants are listed in the following table.

Casinghead gas production in Texas, 1939

Month	Total oil wells	Oil wells connected to gasoline plants	Daily volume produced, thousand cubic feet	Daily casinghead gas to gasoline plants, thousand cubic feet	Percentage wells connected to plants	Percentage casinghead gas processed	Plants operating			Total gas processed daily, thousand cubic feet	Gas vented to air	
							Gasoline	Recycling and repressure	Carbon		Thousand cubic feet daily	Percent
January	85, 838	40, 414	1, 046, 316	965, 864	47. 08	92. 31	149	----------	35	3, 408, 867	369, 064	10. 82
February	85, 970	40, 621	1, 044, 565	961, 139	47. 25	92. 01	149	----------	35	3, 429, 693	346, 725	10. 1
March	86, 406	40, 954	1, 095, 869	1, 001, 957	47. 40	91. 43	147	12	36	3, 369, 015	366, 908	10. 89
April	86, 943	41, 030	1, 132, 894	1, 040, 645	47. 19	91. 85	147	14	36	3, 408, 048	405, 482	11. 90
May	87, 297	41, 233	1, 147, 765	1, 056, 101	47. 23	92. 01	146	16	35	3, 253, 803	401, 418	12. 40
June	87, 623	41, 760	1, 153, 647	1, 059, 862	47. 66	91. 87	149	17	37	3, 302, 840	384, 491	11. 64
July	88, 021	41, 712	1, 173, 734	1, 074, 517	47. 44	91. 54	148	20	37	3, 410, 618	405, 682	11. 89
August	88, 148	41, 408	992, 962	893, 569	46. 98	89. 99	147	20	37	3, 113, 678	337, 922	10. 85
September	88, 356	41, 627	1, 220, 189	1, 124, 320	47. 11	92. 14	149	21	37	3, 591, 445	390, 727	10. 88
October	88. 812	42, 190	1, 264, 659	1, 108, 645	47. 50	87. 66	148	20	38	3, 876, 709	387, 425	9. 99

The statement of oil production and removal from leases, compiled by the Railroad Commission of Texas for the month of October 1939, shows that of the 88,812 wells producing oil, 36,607 or 41 percent, were flowing wells and 59 percent of the wells produced by pumping or agitation. Many of the flowing wells are in fields remote from natural gas pipe lines and in some of them the gas produced with the oil has not been of sufficient volume to cause the operators to install gasoline plants. The casing-head gas produced in such fields, except for a small percentage used locally for heat and power, is vented to the air. This gas is not measured and there is no way of estimating its volume with any degree of certainty.

WYOMING

Waste of reservoir energy in Medicine Bow field

According to reports of oil and gas production made to the Wyoming State Board of Equalization, some wells completed in the first Sundance sand in the Medicine Bow field (Carbon County, Wyo.) are producing with gas-oil ratios of about 13,000 cubic feet per barrel. The gas dissolved in the oil in this sand under reservoir conditions is about 3,000 cubic feet per barrel and the initial gas-oil ratios of the wells were near that figure. This excess of present gas-oil ratio over the quantity of gas dissolved in the oil and the initial gas-oil ratio of the wells indicates avoidable waste of reservoir energy.

Physical waste of gas and waste of reservoir energy in the Lance Creek field

During a period of approximately 2 years beginning in March 1935 several oil wells in the Lance Creek field (Niobrara County, Wyo.) were produced at gas-oil ratios greatly exceeding the amount of gas in solution in the oil and a considerable amount of gas was blown to the air. Such withdrawal of gas caused an undue decline of reservoir pressures and expansion of the gas cap. This waste has now ceased as the gas produced with the oil is being returned to the producing formation, and the undue decline in reservoir pressure has been arrested.

Physical waste of gas on Big Piney structure

A well on the Big Piney structure (Sublette County, Wyo.) blew out on December 3, 1938, from a total depth of 1,695 feet. The gas was thought to be coming from a sand at a depth of about 800 feet. The well was out of control from December 3 to January 29 and was flowing at a rate of about 15,000,000 cubic feet of gas per day with 3,000 to 5,000 barrels of water. The total gas wasted was about 800,000,000 cubic feet.

Physical waste of gas on Dry Piney structure

A well on the Dry Piney structure (Sublette County, Wyo.) was out of control on two occasions as a result of blow-outs from a gas sand at a depth of about 800 feet. The first occurred about October 1 and the second about December 1, 1938. The flow was estimated to be from 25 to 40 million cubic feet of gas per day and the well was out of control for a total of about 10 days. The total gas wasted was about 300,000,000 cubic feet.

Physical waste of gas on Oil Springs structure

A well on the Oil Springs structure (Carbon County, Wyo.) blew wild for about 8 days early in November 1938. The flow was estimated to be from 30 to 40 million cubic feet of gas per day with about 15,000 barrels per day of water. The gas wasted from this blow-out is estimated at 300,000,000 cubic feet.

Physical waste of gas in Garland field

On January 19, 1936, a well in the Garland field (Big Horn County, Wyo.) started to flow gas at a rate of 60,000,000 cubic feet per day from a formation at a depth of 3,835 feet. When the blow-out preventor was closed, gas started to flow through crevices in the ground near the well and from neighboring wells in a shallower formation. The well was opened to prevent cratering and caught fire on March 27, 1936. This fire was extinguished but the gas became ignited again, and was again extinguished. On February 28, 1937, the flow was stopped permanently.

The well was out of control 406 days, and as the estimated average daily loss of gas was 40,000,000 cubic feet the total loss was about 16,000,000,000 cubic feet of gas. Black smoke which appeared in the flames about December 7, 1936, showed that the well also was producing some oil.

Appendix

RODESSA FIELD OF LOUISIANA, TEXAS, AND ARKANSAS

As the Rodessa field extends from Marion County, Tex., through Cass County, Tex., and Caddo Parish, La., into Miller County, Ark., and as the Louisiana portion contains several tracts of public land, the field has been discussed by the Bureau of Mines and the Geological Survey under four different headings. Therefore, this brief supplemental statement has been prepared to consolidate information concerning this field, which is under control of conservation authorities of three States.

Development and operation of the Rodessa field in all of the three States has been characterized by intensive drilling campaigns, excessive gas-oil ratios and premature release of natural gas from solution in the crude oil, with resulting dissipation of reservoir energy and waste of gas to the air, but the waste was most serious in Arkansas. With respect to that waste, the chief conservation agent of Arkansas has said:

"The recent experiences in the Miller County field are ample proof of the folly of inefficient practices. The too rapid, unequal withdrawals in that field have brought about a premature decline in all the wells, which has been appalling to the producers who have invested their money in the field, to the landowners, who have seen their opportunities dissipated, and those of us charged with guarding the interest of the State." [1]

Oil in the Rodessa field was discovered first in Caddo Parish, La., in July 1935, before that State had its present conservation statute. The initial reservoir pressure was about 2,700 pounds per square inch. Development was rapid and, as reported by Crowell,[2] "wells completed without supervision exposed all horizons within the well bore to the detriment of the reservoir." Although proration based on acreage and bottom-hole pressure with restriction on gas-oil ratios, established for the Louisiana portion of the field at the beginning of the year 1937, aided in reducing the waste, the average decline in bottom-hole pressure of the wells in Louisiana from the discovery of oil in July 1935 to the end of 1938 was at the rate of about 1.3 pounds per square inch per day.

The Rodessa Operators' Committee estimated that the cumulative gas production from the Louisiana portion of the Rodessa field to December 31, 1938, was 406,000,000,000 cubic feet, of which 193,000,000,000 was delivered to pipe lines and 213,000,000,000 was blown to the air.[3]

The discovery of oil in the Texas portion of the Rodessa field was in Cass County in December 1935. Early development in that area was rapid and withdrawals were high, with the result that during the period from December 1935 to May 1, 1939, the decline in bottom-hole pressure in Cass County was at the average rate of about 1.3 pounds per square inch per day, or substantially the same as in Louisiana. In 1937 oil was found in Marion County, and it is reported that during the year from December 31, 1937, to December 31, 1938, the bottom-hole pressure in that area declined from 2,677 to 2,309 pounds per square inch,[4] or at the rate of approximately 1 pound per square inch per day.

Following discovery of oil in the Arkansas portion of the Rodessa field in June 1937, development was extremely rapid and the wells were allowed to flow wide open. During the first year following discovery the average bottom-hole pressure of the oil wells in the Arkansas area fell from 2,600 to about 700 pounds per square inch,[5] or at the average rate of 5.2 pounds per square inch per day.

The director of the Arkansas Oil and Gas Commission has estimated that Arkansas "produced her part of the field with only 29 percent of the efficiency of

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[1] Annual report for 1937 of chief conservation agent of Arkansas.

[2] Crowell, Alec M., Rodessa Is an Object Lesson in Control: Oil and Gas Journal, September 29, 1938, p. 27.

[3] Shearer, H. K., Oil and Gas Development in North Louisiana in 1938: Petroleum Development and Technology, 1939, Amer. Inst. Min. and Met. Engrs., Trans. 132, p. 343.

[4] Carter, D. V., and Hachbusch, Franklin M., Development and Production in East and East Central Texas for 1938: Petroleum Development and Technology, 1939, Amer. Inst. Min. and Met. Engrs., Trans. 132, p. 411.

[5] Crowell, Alec M., work cited, p. 28.

Louisiana, and 19 percent of the efficiency of Texas.[6] He has also said, with reference to the Arkansas portion of the Rodessa field:

"Out of a possible $32,000,000, as was represented by the calculated recoverable reserve of crude oil in the first major oil development in Arkansas in a dozen years, it appears that only $7,000,000 will be recovered—at least, by methods of recovery we know today." [7]

As there are public lands in Rodessa field, the wasteful conditions have had a direct effect on the Government's return from oil royalties. The bottom-hole pressure of one tract of public land in the field, leased for a bonus of $107,050.75, was 1,635 pounds per square inch when first drilled in April 1938, but it had declined to 100 pounds by December 1, 1939. On another tract, which was leased for a bonus of $40,948.75 and had a bottom-hole pressure of 1,645 pounds per square inch when first drilled in February 1938, the bottom-hole pressure had declined to 270 pounds per square inch by December 1, 1939. Both tracts are in Louisiana near the Arkansas boundary. Although at the time they were leased conservative estimates of the expected recovery ranged from 6,000 to 8,000 barrels per acre, by December 1, 1939, when most of the pressure had been dissipated they had produced only 122,700 barrels, or about 890 barrels per acre, and 26,600 barrels, or about 666 barrels per acre, respectively.

SUPPLEMENTARY STATEMENT OF NATURAL GAS WASTAGE IN LOUISIANA, TEXAS, AND NEW MEXICO

(Compiled by the Petroleum Conservation Division)

LOUISIANA

An inspection of the M–1 forms filed with the Louisiana Department of Conservation for September 1939, showed that 210 wells in Louisiana were operated that month with gas-oil ratios in excess of 5,000 cubic feet per barrel of oil produced, divided as follows:

High gas-oil ratio wells, Louisiana, September 1939

Range (cubic feet per barrel of oil):	Number of wells
5,000:1 to 10,000:1	131
10,000:1 to 20,000:1	44
20,000:1 to 50,000:1	28
In excess of 50,000:1	7
Total	210

These 210 wells produced in excess of 4,000,000,000 cubic feet of gas during September 1939, or an average of about 20,000,000 cubic feet per well. These wells also produced about 376,000 barrels of oil, or a daily average of 60 barrels per well, with an average gas-oil ratio of 11,200:1. Nearly one-half of the gas produced by these wells was burned in flares in the fields.

Where maximum gas-oil ratios have been established by orders of the Louisiana Department of Conservation and where adjustments are permitted in the production of oil from high gas-oil ratio wells, a definite limit on gas wastage is established by the rule that "no well shall waste, burn, or blow into the air an amount of gas of more value at 3 cents per thousand cubic feet than the market value of the oil recovered."

This rule is based upon the similar limitation contained in the 1924 Louisiana law and extended in subsequent revisions or amendments. There are a number of wells in Louisiana, with high gas-oil ratios and a substantial part of the gas burned in flares, which apparently exceed the maximum gas-oil ratio prescribed by the 1924 law, in that the gas wasted, valued at 3 cents per thousand cubic feet has a higher value than that of the oil produced. Some of these wells, during September 1939 were—

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[6] Crowell, Alec M., work cited, p. 105.

[7] Crowell, Alec M., work cited, p. 26.

Field	Well	Oil produced	Gas produced	Gas-oil ratio
		Barrels	*Cubic feet*	
Bunkie	Well No. 2	1, 122	53, 313, 000	47, 516:1
Abbeville	E. Hebert No. 1	469	23, 547, 000	50, 207:1
Do	L. Duhon No. 1	275	17, 925, 000	65, 181:1
Eng. Bayou	F. N. Bank No. 1	313	12, 573, 000	40, 169:1
Do	H. G. Frost No. 1	65	26, 070, 000	401, 076:1
Do	A. M. Powers No. 1	503	20, 585, 000	40, 924:1
S. Roanoke	Devilbiss No. 1	529	34, 129, 000	64, 516:1

Example: The highest price posted in the Abbeville field is $1.02 per barrel. This price, divided by 3 cents, would establish a maximum gas-oil ratio under the Louisiana law of 34,000 cubic feet per barrel of oil. It will be noted that 2 wells in the Abbeville field exceeded this statutory limitation.

A study of the reports for August 1939, filed with the Louisiana Department of Conservation by oil producers (State-wide Form M–1) and by producers and purchasers of gas (State-wide Form M–2), indicates that approximately 257,000,000 cubic feet of natural gas daily is burned or blown to the air in Louisiana. Of this quantity about 170,000,000 cubic feet daily is gas produced with oil and burned or blown to the air in oil fields and about 87,000,000 cubic feet daily is gas produced from gas fields or residue gas from natural gasoline plants. Of the gas produced from oil wells, 62.3 percent was consumed on leases, burned or blown to the air without the extraction of its natural gasoline content; 27.2 percent was sold; 8.7 percent was used in repressuring; and 1.8 percent was unaccounted for.

The study of these reports was made at New Orleans, La., by two examiners of the petroleum conservation division. Reports filed for August were examined, as many operators had not filed their September and October reports when the study was made in December 1939. The August reports covered only 19 days of operation as there were 12 "shut-down" days in Louisiana during August. The following tables summarize the information obtained:

Gas produced from oil wells

	Total	Daily average	Percent
Oil produced (barrels)	5, 359, 147	282, 060	100.0
Oil produced by operators reporting gas production	4, 618, 231	243, 060	86.2
Oil produced by operators not reporting gas production	740, 916	39, 000	13.8
Reported gas production (cubic feet)	8, 065, 821, 000	424, 517, 000	100.0
Gas sold	2, 197, 561, 000	115, 661, 000	27.2
Consumed on leases	2, 223, 709, 000	117, 037, 000	27.6
Used for repressuring	701, 352, 000	36, 913, 000	8.7
Wasted or burned	2, 795, 536, 000	147, 134, 000	34.7
Unaccounted for	147, 663, 000	7, 772, 000	1.8

Average gas-oil ratio = 1,747 : 1.

If the oil producers who did not report gas production did produce gas and dispose of it in the same manner as did those who reported gas production, the quantity of gas burned or blown to the air daily would be increased by approximately 23,000,000 cubic feet to a total of about 170,000,000 cubic feet.

Form M–1 reports, as required by the minerals division of the Louisiana Department of Conservation, request, among other items, information from oil operators in all fields in the State as to total oil production, gas production from oil wells, and the disposition thereof. In the event that no oil or gas is produced, the instructions provide that the word none should be inserted. Many operators, however, failed to report the quantity of gas produced or reported "none" produced when the magnitude of the oil production is such that it would seem impossible to produce the oil without some gas. Of the 307 operators reporting for August 1939, 164, or 53 percent, failed to report gas produced with oil; 48, or 16 percent, reported none produced; while 95 companies, or 31 percent, reported gas produced with oil.

As an illustration of the apparent failure of many operators to show gas produced with oil on form M-1, the following items refer to operations where, due to the preponderance of flowing wells, it is probable that large quantities of gas necessarily were produced with the oil, although no gas production was reported on the forms M-1 submitted to the Louisiana Department of Conservation.

Operator	Field	Parish	Number of wells	Flowing wells	Oil production
					Barrels
Gulf Refining Co	East Hackberry	Cameron	2	2	11,076
Humble	Lake Washington	Plaquemines	7	7	21,805
Magnolia	Rodessa	Caddo	36	27	9,328
Do	Cotton Valley	Webster	6	4	11,827
Do	Shangaloo	do	2	2	3,429
Texas Co	Vermilion	Iberia	1	1	7,597

In addition to the above, many operators who failed to report gas production reported oil production of such magnitude that it does not seem likely that such quantities of oil could be produced without the production of gas.

The M-1 reports for August 1939 show the following instances in which more than 5,000,000 cubic feet of gas daily were burned in flares during the 19 days in which oil was produced in Louisiana during August.

Gas burned in flares, 19 days, August 1939 (in excess of 5,000,000 cubic feet daily)

Operator	Total gas produced	Gas burned in flares	Percent burned
	Cubic feet	*Cubic feet*	
Atlantic Refining Co	137,198,000	103,511,000	75.4
Continental Oil Co	1,501,476,000	549,371,000	36.5
Fohs Oil Co	720,254,000	520,262,000	72.2
Humble Oil & Refining Co	345,768,000	269,080,000	77.8
Olipbant Oil Corporation	99,705,000	99,705,000	100.0
Republic Products Co	276,000,000	274,731,000	99.5
Shell Oil Co., Inc	471,908,000	185,889,000	39.4
Stanolind Oil & Gas Co	334,817,000	108,843,000	32.5
Texas Co	589,681,000	190,112,000	32.2
Total	4,476,807,000	2,301,504,000	51.4
Daily average	235,621,000	121,132,000	

The above-listed companies account for 82 percent of the 147,134,000 cubic feet of gas produced with oil reported as burned in flares on the M-1 reports filed for August 1939.

TEXAS

The Monthly Summary of Natural Gas Production and Disposition, compiled at the direction of the Railroad Commission of Texas, shows for November 1939, that 451,814,000 cubic feet of natural gas was vented to the air daily in Texas. This represents 11.36 percent of the dry natural gas and the casinghead gas production and disposition reported to the commission. Of the 89,174 producing oil wells reported in Texas for November 1939, 45,751 wells, or 51.3 percent, were reported as being connected to gasoline plants or pipe lines. No record is available as to the natural-gas production or disposition of the remaining 43,423 producing oil wells which were not connected to gasoline plants or gas pipe lines. If these oil wells, unconnected as to gas, had the same average gas production as did the gas-connected oil wells, the unreported casinghead gas production in Texas would total about 1¼ billion cubic feet daily. It undoubtedly is true that the gas production of the unconnected wells would not equal that of the connected wells, but sufficient supplementary data are available to indicate that the quantity of natural gas vented to the air in Texas, including the 451,814,000 cubic feet reported, as well as that unreported, exceeds 1,000,000,000 cubic feet daily. Following are some examples of such supplementary data:

Old Ocean field, Brazoria County.—The wells in the Old Ocean field during 1938 and 1939 have been classified by the railroad commission as oil wells and permitted to produce as such. The apparent gas-oil ratio of these wells during that period ranged from 300 cubic feet per barrel to in excess of 41,000 cubic feet per barrel of oil produced and averaged approximately 23,000 cubic feet of gas per barrel. According to estimates of the railroad commission, during the first 10 months of 1939, there were 64,100,031,000 cubic feet of gas produced in the Old Ocean field and blown into the air. Recycling operations were begun in October 1939, resulting in an estimated average of 49,506,000 cubic feet of gas being returned to the formation daily, with an estimated 197,630,000 cubic feet blown to the air.

The following table shows the production, utilization and waste of natural gas in the Old Ocean field, as estimated from reports filed with the Railroad Commission of Texas. Production was estimated from reports made on EB forms; sales and utilization from Form 3–266 and RC–1 reports.

Old Ocean field, Brazoria County, Tex., estimated total gas produced, utilized and blown to the air January–October 1939

[Figures in cubic feet]

	Estimated total gas produced	Daily average	Reported sold, utilized, or repressured	Estimated blown to the air	Daily average
January	5, 849, 438, 000	188, 692, 000	----------------	5, 849, 438, 000	188, 692, 000
February	5, 477, 347, 000	195, 620, 000	145, 699, 000	5, 331, 648, 000	190, 416, 000
March	6, 338, 515, 000	204, 468, 000	169, 812, 000	6, 168, 703, 000	198, 990, 000
April	6, 196, 477, 000	206, 549, 000	161, 980, 000	6, 034, 497, 000	201, 150, 000
May	6, 681, 578, 000	215, 535, 000	165, 491, 000	6, 516, 087, 000	210, 196, 000
June	6, 581, 970, 000	219, 399, 000	165, 883, 000	6, 416, 087, 000	213, 870, 000
July	7, 467, 444, 000	240, 885, 000	171, 169, 000	7, 296, 275, 000	235, 364, 000
August	7, 262, 266, 000	234, 267, 000	171, 018, 000	7, 091, 248, 000	228, 750, 000
September	7, 440, 502, 000	258, 017, 000	170, 981, 000	7, 269, 521, 000	242, 317, 000
October	7, 904, 514, 000	254, 984, 000	1, 777, 987, 000	6, 126, 527, 000	197, 630, 000
Total	67, 200, 051, 000	221, 053, 000	3, 100, 020, 000	64, 100, 031, 000	210, 855, 000

Saxet and Saxet Frio fields.—The delivery of gas from each well in Texas is posted monthly in a ledger in the Austin office of the railroad commission, 1 page of the ledger for each well. In this ledger, there are 95 pages for the Saxet field and 85 pages for the Saxet Frio field, making a total of 180 pages, or 180 gas wells, for the 2. For the month of October 1939, the summary for the Saxet field shows 28 wells to have reported production and 42 wells in the Saxet Frio, or a total of 70 wells, out of 180 wells, in the Saxet and Saxet Frio fields reporting production. There is no information in the ledger to show whether the nonreporting wells are shut in, off production, abandoned, or just not reporting.

On 35 of these 70 reporting gas wells there was no record of an open flow potential having been taken. The 35 wells on which potential tests had been made from 1936 to 1939 were operating within 25 percent of their potentials according to the operators' reports. On the test tickets for 13 of the wells for which no potential had been taken, there were notations that the well was making too much salt water to be shut in for a test. There were numerous changes of rating from oil well to gas well and from gas well to oil well with no record of a test having been made on the well or with no reason given for the change. Of the 70 reporting gas wells, 29 reported that the gas was used for jetting oil wells; 19 reported delivering their gas to gas pipe lines; and 22 did not report the disposition of the gas. Ten additional gas wells reported delivering gas to gasoline plants.

Of the 538 oil wells reporting oil production in the Saxet and Saxet Frio fields during October 1939, only 158 reported delivering casinghead gas to gasoline plants. Ten wells reported delivering casinghead gas not processed.

Summarizing, of the total of 718 gas wells and oil wells in the Saxet and Saxet Frio fields, 248 wells, or 34.5 percent, accounted for their gas deliveries.

The 248 reporting gas wells and oil wells accounted for the disposition of 5,169,421,000 cubic feet of gas, a daily average of 166,755,000 cubic feet, during October 1939. The reporting wells, during the first 8 months of 1939, accounted for a daily average disposition of 170,011,000 cubic feet.

Even though some of the nonreporting wells may have been "dead" or shut in, it is still possible that the reported disposition of approximately 170,000,000 cubic feet daily by the reporting wells may not represent 50 percent of the reservoir withdrawals of gas and that the unreported withdrawals may equal or exceed that reported.

La Belle field.—One well in the La Belle field, the Broussard and Hebert No. 3, blew out of control on April 1, 1938, when a cut drill pipe was being removed from the hole. The subsequent table shows the quantity of natural gas produced by this one well during the year following, during which period attempts were made to bring the well under control. Substantially all of this gas was burned in the field.

	Gas produced (cubic feet)	Daily average (cubic feet)		Gas produced (cubic feet)	Daily average (cubic feet)
1938			1939		
April	2, 015, 514, 000	67, 184, 000			
May	2, 458, 621, 000	79, 310, 000	January	1, 864, 306, 000	60, 139, 000
June	2, 361, 239, 000	78, 708, 000	February	1, 710, 160, 000	61, 077, 000
July	2, 387, 005, 000	77, 000, 000	March	1, 857, 412, 000	59, 917, 000
August	2, 321, 914, 000	74, 900, 000			
September	2, 150, 957, 900	71, 700, 000	Total	25, 630, 764, 000	70, 221, 000
October	2, 151, 382, 000	69, 400, 000			
November	2, 195, 304, 000	73, 177, 000			
December	2, 156, 950, 000	69, 579, 000			

NEW MEXICO

Prior to the meeting on December 9, 1939, New Mexico had not adopted any regulation, either for the State or for individual fields, to limit the amount of gas to be produced with a barrel of oil. On July 22, 1938, A. Andreas, then acting State geologist, said that the majority of the operators had not taken the gas-oil ratio problem seriously in the past and unless every possible measure was taken to correct high gas-oil ratios, the commission would be forced to adopt a maximum gas-oil ratio for the various fields.

The following average gas-oil ratios for certain fields in New Mexico were reported in the 1938 summary of operations prepared by the engineers committee of the Lea County operators committee. These fields, all of which are located in Lea County, produced 92 percent of the 1938 oil output of New Mexico.

New Mexico average gas-oil ratios, 1938

Field	Oil production (barrels)	Gas production (cubic feet)	Gas-oil ratio
Cooper	1, 682, 178	22, 755, 387, 000	13, 527:1
Eaves	331, 827	4, 879, 282, 000	14, 704:1
Eunice	8, 872, 335	44, 712, 325, 000	5, 039:1
Hardy	620, 268	3, 874, 976, 000	6, 247:1
Hobbs	5, 010, 414	11, 430, 579, 000	2, 281:1
Jal	361, 675	8, 944, 830, 000	24, 731:1
Langlie	1, 219, 006	10, 731, 614, 000	8, 903:1
Lynn	285, 299	1, 471, 641, 000	5, 158:1
Mattix	935, 760	4, 307, 397, 000	4, 603:1
Monument	9, 440, 344	29, 772, 558, 000	3, 153:1
Penrose	1, 522, 402	7, 991, 694, 000	5, 249:1
Rhodes	39, 002	7, 397, 966, 000	189, 682:1
Skelly	523, 528	3, 099, 369, 000	4, 010:1
S. Eunice	1, 012, 178	4, 838, 512, 000	4, 780:1
Vacuum	850, 703	936, 998, 000	1, 101:1
Total	32, 706, 919	166, 145, 128, 000	5, 080:1

Inasmuch as the marketed production of natural gas during 1938, including gas from both gas wells and oil wells, did not exceed 51,000,000,000 cubic feet, according to Bureau of Mines statistics, it is apparent that more than 100,000,000,000 cubic feet of natural gas was wasted in New Mexico during 1938, or an average of about 300,000,000 cubic feet daily.

Bureau of Mines statistics show also that 97,830,000,000 cubic feet of natural gas were treated at natural gasoline plants in New Mexico during 1938, producing 49,596,000 gallons of natural gasoline, or an average of 0.507 gallon per thousand cubic feet of gas. This would leave untreated 68,315,128,000 cubic feet or 41 percent of the gas production reported for 1938 by the engineers committee, as shown in the above table.

If the untreated gas would yield the same quantity of natural gasoline as that treated (0.507 gallon per thousand cubic feet), the unrecovered natural gasoline content of the 68,315,000,000 cubic feet would total 34,630,000 gallons.

A similar comparison for 1937 shows that 61,625,000,000 cubic feet of Lea County natural gas was treated at natural gasoline plants and approximately 57,000,000,000 cubic feet was untreated.

In connection with the wastage of natural gas in New Mexico, it should be noted that the output of gas wells in New Mexico is not regulated nor does New Mexico prohibit natural gas produced from a gas well to escape into the air before or after such gas has been processed for its gasoline content. It would follow, therefore, that oil wells with excessively high gas-oil ratios could be transferred in classification from oil wells to gas wells and thereby avoid any regulatory limitation on gas or oil production.

Mr. COLE. Mr. Andreas, you want this paper also made a part of your testimony?

Mr. ANDREAS. Yes, sir.

Mr. COLE. It will be put in at its proper place.

I think that you will find the reports which I have just filed of real interest if you would like to see them. I know, without any explanation, that you would like very much to see them.

Colonel THOMPSON. We will have that privilege given to us over the week end?

Mr. COLE. Provided they are examined in the office here.

Colonel THOMPSON. What are they, Mr. Chairman?

Mr. COLE. The reports which I have just introduced are from Secretary Ickes, the Geological Survey and the Bureau of in Mines, supplementing Secretary Ickes' statement and supplemental reports on avoidable waste in oil and gas production.

Colonel THOMPSON. We will be grateful for an opportunity to examine them.

Mr. COLE. I hope that they will be printed in time for the industry to have them in preparing its case, and to be in our hands before the 19th. They will be available in the present form to all interested.

Colonel THOMPSON. May we examine them?

Mr. COLE. You may examine them here.

Colonel THOMPSON. We will stay here all night if necessary to do so.

We thank you.

Mr. COLE. The committee will recess until 10 o'clock tomorrow morning.

(Thereupon, at 4:20 p. m., a recess was taken until 10 a. m. of the following morning, Friday, February 9, 1940.)

PETROLEUM INVESTIGATION HEARINGS

FRIDAY, FEBRUARY 9, 1940

House of Representatives,
Subcommittee of the Committee on
Interstate and Foreign Commerce,
Washington, D. C.

The subcommittee met, pursuant to adjournment, in the committee room, New House Office Building, at 10 a. m., Hon. William P. Cole, Jr., presiding.

Mr. Cole. The committee will please come to order.

Mr. Staley, we will hear you.

STATEMENT OF A. ANDREAS—Resumed

Mr. Andreas. Mr. Chairman, I would like to include in the record something I did not read yesterday, if I may.

Mr. Cole. It depends upon how long it is.

Mr. Andreas. It will take me about 10 minutes at the most.

Mr. Cole. All right; go ahead. Have you a copy?

Mr. Andreas. In explanation of the high gas-oil ratios, particularly in answer to the questions Mr. Wolverton asked me yesterday in regard to the Cooper pool——

Mr. Cole. In regard to what?

Mr. Andreas. In regard to the Cooper pool:

Some of the reported extremely high gas-oil ratios in the Jal-Cooper field are not formational gas-oil ratios, as they include both the formational gas and the gas injected for lifting purposes. The control of gas-oil ratios in both of these fields has been more difficult, perhaps, than in any of the other fields of the State. Many hundreds of thousands of dollars have been spent on remedial work, 33 percent of the wells having had such work done, in an attempt to correct gas-oil ratios. The main oil-bearing horizon and bottom waters occupy planes nearly parallel to sea level stratum. The gas pays, although directly associated with the oil and water, have a tendency to conform with and follow closely the structural conditions.

Records of several edge wells drilled in the field have shown the rapid rate at which water can replace oil or gas in the main line pay. This condition suggests, therefore, that subsea pressures may reflect only to a minor degree the amount of depletion of oil or gas from the reservoir. The reservoir at this time is considered to be nearing the exhaustion stage. It is considered by the commission to be at that point in the life of a water-driven porous lime pay field where it is necessary to produce fluid in large quantities in order to avoid waste by entrapment of oil in the reservoir.

The gas reserves encountered with the oil in these fields have been drawn upon to aid in oil discovery by utilizing it to produce water in large quantities, thereby flusing out the remaining oil.

Much of this gas finds a market through purchase for public utilities use. If the use of gas for gas lift be prohibited, waste would result, as other methods of lifting large quantities of water in order to produce the remaining oil are not feasible from an economical standpoint. The present method of handling the field results in recovering more of the oil and in the sale of much of the gas. It is therefore considered to be the best method of preventing avoidable waste without confiscation.

And there is one remark that I would like to make in regard to the apparent 2,000-cubic-foot per-barrel gas-oil ratio, which is recommended or suggested by your committee or in the Cole bill.

If this 2,000 cubic feet maximum gas-oil ratio were put into effect it would have the tendency or it would close over 60 percent of the wells in the United States, and by so doing it would increase the price of gasoline to the consumer by several hundred percent.

Mr. Cole. You mean if it were put into effect in every field?

Mr. Cole. Do you think that is contemplated?

Mr. Andreas. No. Apparently——

Mr. Cole. Why are you suggesting it?

Mr. Andreas. I beg your pardon.

Mr. Cole. If you do not think it is contemplated, why are you suggesting it?

Mr. Andreas. From the questions directed to me in regard to the gas-oil ratio in New Mexico, it apparently is suggested that New Mexico establish a 2,000-cubic-foot gas-oil ratio and if that were put into effect New Mexico would have to close over half of its wells.

Mr. Cole. I expect that is true not only in New Mexico, but in some other places; my understanding is that the physical characteristics of the various fields is taken into consideration, and if a certain finding does not fit a particular field, why, something would be done to meet the requirements of such other field.

Mr. Andreas. Yes.

Mr. Cole. That certainly is the common sense interpretation of what the bill means.

Mr. Andreas. Well therefore, the 2,000-foot gas-oil ratio would not be applied to all fields?

Mr. Cole. I do not think so, and if it does, the language should be changed.

Mr. Andreas. And then in regard to stabilization and conservation, why, we think those are interwoven and one cannot be applied without the other and in closing, I would like to make the statement that New Mexico still considers price a paramount issue and if the price is cut we consider that there is an overproduction of oil and that the market is oversupplied with oil.

And, I would like to make a request that I be permitted to file a statement with regard to gas waste as you brought out in your questions yesterday and on former days, if I may.

Mr. Cole. Very well.

Mr. Andreas. And file a statement in regard to the new testimony that was brought in yesterday afternoon.

Mr. Cole. What do you mean by that?

Mr. ANDREAS. I think from the Department of the Interior, the Bureau of Mines, and the Geological Survey. I would like permission to answer those.

Mr. COLE. Have you seen those reports?

Mr. ANDREAS. No. I glanced over them yesterday.

(That portion of Mr. Andreas report not read follows:)

Attached hereto is a regional map showing the location and extent of all fields in southeastern New Mexico. In addition to the producing area shown on this map, there are three small producing oil fields and one gas field located in the extreme northwestern part of the State, but due to the fact that these fields are located on the Navajo Indian Reservation and are under the supervision of the Conservation Department of the United States Geological Survey, they will not be considered in this report. Besides these, there are three small oil fields and one gas field on fee and State lands in the San Juan Basin area.

(Those areas colored green are producing from lime or Dolomitic formation and those colored red are producing from sand bodies or sand lens.)

In Eddy County, there are 11 producing oil and gas fields. The oil is produced from both sand and lime and is predominately a sweet crude with an average gravity of 37°. There is very little gas dissolved in the crude in any of these fields, the average being about 300 cubic feet per barrel. Due to this condition, conservation of reservoir energy has not been a very great problem. There are a few gas wells which find a ready sale, supplying the local market.

There are a number of small refineries located in the Pecos Valley adjacent to this producing area. The Malco refinery is located at Artesia and has a capacity of 3,000 barrels of oil per day. This plant is equipped with the cracking type installation. The Continental Oil Co. has a plant located in Artesia with a rated capacity of approximately 2,800 barrels of crude per day. This is also a cracking plant. The Midwest Refinery Co. has a topping or skimming plant with a rated capacity of 1,000 barrels per day. There are two other small refineries—the Pecos Diamond and the Universal, both of which are topping plants, having a rated capacity of approximately 250 barrels per day. The Valley Refining Co. is located at Roswell, N. Mex. and has a capacity of 500 barrels per day. It is a topping plant.

The area is served by the following pipe lines: Murchison and Closuit, capacity 3,600 barrels per day; New Mexico Pipe Line Co., capacity 3,600 barrels per day; Texas-New Mexico Pipe Line Co., capacity approximately 10,000 barrels per day. About 400 barrels a day are marketed to the above small refineries by truck.

The following fields are located in Eddy County: Artesia, Barber, Getty, Grayburg-Jackson, High Lonesome, Leonard, Loco Hills, McMillan, Red Lakes, Robinson, and Shugart.

A brief history of the above fields is as follows:

ARTESIA FIELD

The Artesia field is located in ranges 27 and 28 east, and townships 18 and 19 south. The discovery well was completed in August 1923. The principal productive area is in the western half of township 18 south, range 28 east. The mineral rights are principally owned by the State of New Mexico. The production comes from porous sandy lime zones, between 2,000 and 2,400 feet in depth. This was the first oil field of importance discovered in New Mexico.

The field has produced and is producing on an average of approximately 200,000 barrels per year. All wells in the field are being pumped. The field has recovered to date approximately 4½ million barrels of oil. There is no general well-spacing program in the field.

BARBER POOL

The Barber pool is located in T. 20 S., R. 30 E. Mineral rights are divided equally between the State and the Federal Governments. The production of the oil, which has an asphalt base, is produced from a lime formation varying in depth from 1,400 to 1,500 feet. This field was discovered in 1937. There are nine wells in the field having a total potential of 1,200 barrels per day. The field has produced approximately 45,000 barrels of oil to date. There is very little, if any, gas dissolved in the oil.

GETTY FIELD

The Getty field is located in T. 20 S., R. 29 E. It was discovered by the Getty Oil Co. in November 1927. The oil is a heavy asphalt base crude. Very little oil has been marketed from this field since its discovery, approximately 375,000 barrels of oil having been produced to date.

GRAYBURG-JACKSON AREA

The Grayburg-Jackson area is located in T. 17 S., Rs. 30 and 31 E. The mineral rights in this area are principally owned by the Federal Government. The oil is produced from a porous lime zone between 3,200 and 3,800 feet in depth. The field was discovered in January 1936, but it was not until 1938 that there was any great amount of activity from the drilling standpoint. There are now 125 producing wells in the area. Approximately 6½ million barrels of oil have been recovered to date. The conservation of reservoir energy in this area is not a serious problem. There were only approximately 300 cubic feet of gas dissolved in each barrel of oil originally.

LEONARD GAS FIELD

The Leonard field is located in T. 17 S., R. 29 E. Some of the wells in the area produce a small amount of oil; others are gas wells. The area is classed as a gas field.

Mineral rights are held by the Federal and State Governments. The gas is produced from horizons 2,200 to 2,400 feet in depth and the oil is produced from horizons 2,900 to 3,000 feet in depth. The gas is produced from sand. The oil comes from porous lime horizons. The field was discovered in November 1929. There are approximately 20 oil wells and 12 gas wells in the area.

LOCO HILLS

The Loco Hills area is located in T. 18 S., Rs. 29, 30, and 31 E. The field was discovered in February 1939. There are approximately 70 wells completed at the present time.

MCMILLAN AREA

The McMillan area lies in Tps. 19 and 20 S., R. 27 E. At the present time there is but one small well pumping 30 barrels from a sandy horizon at 1,180 feet.

RED LAKES FIELD

The Red Lakes field is located in T. 17 S., Rs. 27 and 28 E., just north of the old Artesia Pool. This area was discovered in 1924 and is primarily a gas field. There are 25 oil wells and 14 gas wells. The oil wells are small and are all on the pump. The gas produced is sold for domestic purposes in the nearby city of Artesia.

ROBINSON FIELD

The Robinson field was discovered in 1926 and is located in T. 16 S., R. 31 E. The discovery well was a gas well which made approximately 10,000,000 cubic feet of gas per day. Since that time about 12 oil wells have been drilled. The mineral rights are held by the State and Federal Governments. The crude is undersaturated and therefore gas conservation is not a problem.

SHUGART FIELD

The Shugart field is located in Tps. 18 and 19 S., R. 31 E. It was discovered in May 1938. The oil is of paraffin base and produced from a sand. There are 11 oil wells in the area. All wells are small and the oil must be pumped. Mineral rights are held almost entirely by the Federal Government. Gas conservation is not a problem.

From the inception of production in the areas described above until October 1, 1935, no proration methods were in effect, due to the local market being able to absorb the entire production of oil and gas. In 1935 the operators in these areas requested that the Oil Conservation Commission of the State of New Mexico prorate the market outlet among the producing fields in the area. Except for a very short period, the system of allocation of the market outlet has been on a 40-acre unit basis.

LEA COUNTY

There are 24 producing fields in Lea County: Cooper, Corbin, Eaves, Eunice, Halfway, Hardy, Hobbs, Jal, Langlie, Lynch and North Lynch, Lynn, Maljamar, Mattix, Monument, North Maljamar, Penrose, Rhodes, Skaggs, Skelly, South Eunice, South Lovington, South Maljamar, Vacuum, and West Eunice.

As indicated on the attached map, these fields are producing from the upper Permian San Andres limestone and the Yates sand. The oil from the limestone is sour, and that from the sandstone is sweet. In the limestone producing areas, the average depth of wells varies from 3,300 feet in the Eaves area and becomes progressively deeper, going north to the South Lovington field where the average depth is approximately 4,700 feet. The average depth in the sand producing fields is 3,600 feet. None of the oil produced in Lea County is refined within the State except that produced in the Maljamar area, but is transported by pipe line to the Gulf coast in the State of Texas and eastern points. Gas produced with the oil in the State of New Mexico is used for development purposes, for domestic supply (camps, local, towns, and villages). The southern part of this area is served by the El Paso Natural Gas Co. which transports gas from New Mexico through a 16-inch line to El Paso, Tex., and from El Paso the gas is piped to several communities in southeastern New Mexico and points in Arizona, Chihuahua and Sonora, Mexico. There are six plants erected for the extraction of gasoline from the gas that is produced with the oil. These plants have a combined capacity of 235,000 gallons of gasoline a day. The gas from the Hobbs pool contains approximately 1.42 gallons of gasoline in each thousand cubic feet of gas, and the average of other fields to the south varies from 0.75 to 1 gallon per thousand cubic feet.

The only refinery in Lea County is located at the Warren gasoline plant in the Monument pool (capacity 350 barrels per day).

HOBBS FIELD

The conservation of reservoir energy in the Hobbs pool began shortly after the completion of the discovery well in June 1928. Through the cooperative efforts of the operators, the State geologist, and the representatives of the Federal Government, a uniform-spacing rule was adopted. The engineers for the operators, working with the representatives of the State and Federal Governments, adopted a casing program that, in their opinion, would properly protect all gas, oil, and water horizons lying above the white lime from which the production of the field was being taken.

All wells of the Hobbs pool were completed with tubing flow strings run close to bottom for control of gas-oil ratios. This pool was one of the first, if not the first, important pool where this practice was followed. This was an important step in reservoir-energy conservation, and is now common practice.

A great deal of money and effort was expended in gathering engineering data as to the character of the producing reservoir. Drill-stem tests were made of every foot of pay in a number of wells. Accurate records were kept of drilling time while drilling the pay on a large number of wells. Microscopic examinations were made of the drill cuttings. Early in the life of the field, it became known that the encroachment of edge water and the spread of the gas cap on the crest of the structure was interrelated and in the beginning confined to the upper part of the pay in the white lime. This white lime is below the sandy dolomitic horizon, the depths ranging from 3,950 feet to 4,185 feet, and over the greater part of the structure it is divided into two pay horizons with a third occupying a limited portion of the field, the upper portion being very porous and prolific, and the lower being less porous and less prolific. Through microscopic examination and insoluble-residue chemical analysis, it was found that an impervious marker existed between the first two pays. It was then possible in the gas-cap area to set a tubing packer at this marker and produce the oil from the next lower pay at near saturation gas-oil ratios. Originally, there was approximately 800 cubic feet of gas dissolved in each barrel of oil.

Eighty-one of the wells in the Hobbs pool have had corrective remedial work done. Of this number, 79 were packer wells and in practically all cases this remedial work was successful. Due to the study made by the engineers and geologists representing the State, Federal, and company interests, and applying their recommendations, it has been possible to produce approximately 90,000,000 barrels of oil from the Hobbs pool, with a loss in reservoir pressure of 3.8 pounds per million barrels of oil produced. It is estimated that 85 percent of the recoverable oil in the pool will be produced by the flowing method, and that the percentage of recoverable oil will be greatly increased due to this conservation work. If it were not for the remedial work done throughout the life of the pool, undoubtedly, all producing wells in the field would now be pumping. The average gas-oil ratio in the Hobbs pool at the present time is 1,882.

EUNICE AND MONUMENT

As these fields were developed, intensive studies of reservoir conditions, both from a geologic and engineering standpoint, were carried out. While it was found in the Hobbs pool that the reservoir remedial work could be carried out as a pool, in these fields all remedial work developed into individual well problems and in a number of cases where successful remedial work was done it proved to be only temporary because as oil was withdrawn the gas cap moved down vertically instead of structurally and the water table moved upwards likewise. Report of Investigation No. 3456 on Reservoir Characteristics of the Eunice Oil Filds, Lea County, N. Mex., by Mr. C. C. Anderson, United States Bureau of Mines, gives a detailed description of the erratic characteristics of the Eunice pool.

JAL AND COOPER

Inasmuch as the Jal and Cooper fields show many common characteristics in structure and deposition, the similarity existing between producing characteristics within the two fields may be expected.

Each field is an anticlinal structure having relatively sharp dips and showing pronounced permeability in the lower lime pays. In each field gas, oil, and water have been found to occur in direct association and prior to development these fluids have no doubt occupied their customary positions. However, a small withdrawal of oil has disturbed the equilibrium of each reservoir to such an extent that oil cannot be produced without a large amount of gas and water.

Some of the reported extremely high gas-oil ratios in the Jal-Cooper field are not formational gas-oil ratios, as they include both the formational gas and the gas injected for lifting purposes. The control of gas-oil ratios in both of these fields has been more difficult, perhaps, than in any of the other fields of the State. Many hundreds of thousands of dollars have been spent on remedial work, 33 percent of the wells having had such work done, in an attempt to correct gas-oil ratios. The main oil-bearing horizon and bottom waters occupy planes nearly parallel to sea-level datum. The gas pays, although directly associated with the oil and water, have a tendency to conform with and follow closely the structural conditions.

Records of several edge wells drilled in this field have shown the rapid rate at which water can replace oil or gas in the main lime pay. This condition suggests, therefore, that subsea pressures may reflect only to a minor degree the amount of depletion of oil or gas from the reservoir. The reservoir at this time is considered to be nearing the exhaustion stage. It is considered by the commission to be at that point in the life of a water-driven porous lime pay field where it is necessary to produce fluid in large quantities in order to avoid waste by entrapment of oil in the reservoir.

The gas reserves encountered with the oil in these fields have been drawn upon to aid in oil recovery by utilizing it to produce water in large quantities, thereby flushing out the remaining oil.

Much of this gas finds a market through purchase for public utilities' use. If the use of gas for gas lift be prohibited waste would result as other methods of lifting large quanitities of water in order to produce the remaining oil are not feasible from an economical standpoint. The present method of handling the field results in recovering more of the oil and in the sale of much of the gas. It is therefore considered to be the best method of preventing avoidable waste without confiscation.

MALJAMAR FIELD

The Maljamar field is located in T. 17 S., R. 32 E. Mineral rights are all held by the Federal Government. The field was discovered in 1926. There are about 30 oil wells in the area and 1 gas well. Gas and oil are coming from separate horizons and the gas in solution is very low. Therefore, the conservation of reservoir energy is not a serious problem. The majority of the wells are flowing.

SAND AREAS

Through geological studies of the pay section of the sand fields, it has been noted that the oil and gas exist in the same zone with no stratigraphic breaks between them and the amount of the gas withdrawals at any period of time is in direct proportion to the oil withdrawals. This indicates that recycling of the gas will probably be the most effective conservation work that could be undertaken.

There are several cooperative plans now being considered to return the gas produced in the sand areas to the reservoir.

Remedial work—Gas and water packers

COOPER, HARDY, EAVES, LANGLIE, MATTIX, VACUUM

Company lease	Well	Location	Date set	Depth set	Surface elevations	Subsea depth packer	Total depth well	Gas-oil ratio		Percent water		Remarks
								Before	After	Before	After	
Anderson Prichard Oil Corporation:		*S. T. R.*										
Wells	3	5-25-37	Sept. —, 1938	3,443	3,259	−184	3,567	80,357	1,000			
Do	6	5-26-37	June —, 1939	3,413	3,241	−172	3,545	16,026	835			
Humble Oil & Refining Co.:												
Coates	1	10-24-37	May 21, 1935	3,532	3,373	−159	3,563	14,000	512			
Italo Petroleum Corporation:												
Wells B	2	4-25-37	Mar. 26, 1939	3,443	3,218	−225	3,514	18M	1,000			
Ohio Oil Co.:												
St. Staplin	2	30-17-35	Apr. 19, 1939	4,028	3,898	−130	4,710	No result				Flow packer.
Hardy	1	20-21-37	July 23, 1939	3,675	3,489	−186	3,750	660	900			
Repollo Oil Co.: York	1	20-21-37	Feb. 19, 1937	3,676	3,489	−187	3,850			3 to 5	3/10 of 1 percent.	
Richmond Drilling Co.: State A.	1	2-25-37	Feb. 12, 1939	3,338	3,171	−167	3,446	13,700	2,652			
Stanolind Oil & Gas Co.:												
Myers B	2	11-24-36	Mar. 13, 1938	3,547	3,394	−153	3,562	18,000	6,099			
Farnsworth A	1	13-26-36	Mar. 11, 1939	3,110	2,955	−155	3,127			87	26	(85 B. F. P. D.)
Do	1	7- 8-39	do	3,110	2,955		3,127			26	77	
Do		7- 8-39	(1)									Gas well producing oil and water.
Do	1	7- 8-39	June 29, 1939	3,110	2,996	−114	3,127			77	30	
Do	3	18-26-37	June 21, 1938	3,096	2,957	−139	3,114			98	97	
Langlie B	3	14-25-38	Apr. 13, 1938	3,254	3,095	−159	[2] 3,375	2,000-5,000				
Langlie A	1	9-25-37	Oct. 27, 1938	3,449	3,156	−293	3,466			40	3 to 5	
Meyers B	2	4-24-37	Dec. 22, 1938	3,508	3,269	−239	3,570	6,000	5,681			
Meyers A	1	22-24-37	June 22, 1937	3,421	3,256	−165	3,552	25,000	2,020			Fibertex seal above packer.
The Texas Co.:												
E. Alexander	1	7-21-37	Mar. 18, 1938	3,665	3,488	−177	3,835					
						P. B.	3,817	171,000	7,500			
Fristoe A	4	3-25-37	June 14, 1938	3,314	3,146	−168	3,480	18,000	1,500			
Do	5	3-25-37	Oct. 18, 1938	3,330	3,136	−194	3,480	6,628	2,144			
Anderson Prichard Oil Corporation:												
Wells	9	6-25-37	July 31, 1939	3,401	3,240	−161	3,540	300	300	40	15	
Do	9	6-25-37	Aug. 7, 1939	3,530	3,240	−290	3,540	300	300	15	15	
Do	10	4-25-37	Aug. 15, 1939	3,447	3,226	−221	3,529	9,000	4,400			
Blinebry	2	29-23-37	July 30, 1939	3,516	3,304	−212	3,589	166,666	166,666			
Do	2	29-23-37	Aug. 1, 1939	3,550	3,304	−246	3,589	166,666	0			
Do	2	29-23-37	Aug. 8, 1939	3,530	3,304	−226	3,589	166,666	5,666			

The Texas Co.:												
Black	2	21-24-37	June 18, 1937	3, 015	3, 227	+212	3, 565	14,800	1,600			
Do	3	21-24-37	Sept. 15, 1938	3, 390	3, 233	−157	3, 495	25,000	1,500			
Do	4	21-24-37	Jan. 10, 1939	3, 288	3, 234	−54	3, 565	17,000	1,525			
Fristoe A	1	35-24-37	Feb. 11, 1938	3, 365	3, 201	−164	3, 531	12,000	10,500			
State M	1	1-18-34	Jan. 24, 1938	4, 312	4, 003	−309	4, 550	9,160	1,660			
State L	1	1-18-34		4, 310	3, 998	−312	4, 497	4,730	1,360			
Western Gas Co.:												
Toby	1	12-24-36	May 12, 1939	3, 508	3, 323	−185	3, 710	10/1	100 percent oil.	10		Water packer.
Do	1	12-24-36	do	3, 443	3, 323	−120	3, 710	500/1	280/1			Gas packer. Tubing perfect between packers.
Shell Oil Co.:												
State A	4	31-17-35	Feb. 14, 1939	4, 670								
State B	1	30-12-35	Feb. 18, 1939	4, 660								Water.
State F	1	29-17-35	Feb. 5, 1939	4, 670								Do.
State G	2	29-17-35	Dec. 19, 1938	4, 678								Do.
State H	1	29-17-35	Nov. 25, 1938	4, 249								Gas.
Gulf Oil Corporation:												
Arn. Ramsey B	1	32-25-37	Aug. 2, 1935	3, 100	2, 984	−116	3, 240	1,071,000	1,333			Completion of well.
G. E. Cooper	1	11-24-36	Jan. 1, 1936	3, 487	3, 368	−119	3, 525	(?)	4,329			
Stuart	1	10-25-37	June 20, 1936	3, 331	3, 120	−211	3, 431	High	2,310			Do.
V. Ramsey	1	12-26-36	Aug. 3, 1935	3, 140	2, 956	−184	3, 180	(?)	(?)			Do.
Boyd	1	23-22-37	Aug. 22, 1939	3, 266	3, 324		3, 681					Flow packer.
E. King	1	28-21-37	June 15, 1936	3, 688	3, 469	−219	3, 804	15,328	6,586			
Stebbins	1	5-22-37	May 31, 1939	3, 664	3, 442	−222	3, 760					Acidizing below packer.
Arn. Ramsey	2	2-25-36	Dec. 16, 1939	3, 460	3, 262	−198	3, 542			10,000 barrels per day.	5,000 barrels per day.	Reduced water 50 percent.
Do	2	2-25-36	Jan. 8, 1939	3, 410	3, 262	−148	3, 542					
Shahan	1	33-25-37	Feb. 18, 1939	3, 115	3, 011	−104	3, 280	Gas lift	Flow			Flow packer.

EUNICE POOL

Amerada Petroleum Corporation:												
Houston	1	7-21-36	Oct 5, 1935	3, 813	3, 603	−210	3, 833	13.460	1,245			
Do	2	7-21-36	Jan. 26, 1936	3, 797	3, 590	−207	3, 880	75,200	638			
Do	3	7-21-36	Mar. 11, 1936	3, 821	3, 600	−221	3, 895	24,800	795			
State W	4	30-20-37	Apr. 5, 1937	3, 755	3, 545	−210	3, 820	21,300	1,050			
Do	2	30-20-37	July 6, 1939	3, 742	3, 538	−204	3, 888	193,000	Swabbing	80	80	
Do	3	30-20-37	Apr. 10, 1939	3, 740	3, 541	−199	3, 852	114,729	3. 575			
Devonian Oil Co. Heasley St.	4	5-21-36	June 13, 1936	3, 771	3, 575	−196	3. 875	60,000	818			
Humble Oil & Refining Co.:												
Adkins	2	10-21-36	Feb. 6, 1936	3, 863	3, 591	−272	3, 880			90	0	
Fopeano	3	25-20-36	Sept. 20, 1938	3, 765	3, 558	−207	3, 855	34,000	2,300			
Knox	1	10-21-36	Mar. 25, 1936	3, 797	3, 595	−202	3, 865	37,000	1,370			
Do	4	10-21-36	Aug. 29, 1936	3, 784	3, 576	−208	3, 866	16,000	1, 204			

[1] Total daily fluid before packer 1, 066 barrels. After 26 barrels.
[2] Had been shut in.

Remedial work—Gas and water packers—Continued

EUNICE POOL—Continued

Company lease	Well	Location	Date set	Depth set	Surface elevations	Subsea depth packer	Total depth well	Gas-oil ratio		Percent water		Remarks
								Before	After	Before	After	
Humble Oil & Refining Co.—Continued.												
Knox—Continued.		*S. T. R.*										
Do	7	10-21-36	Dec. 5, 1936	3,800	3,598	−202	3,890	3,103	1,040			
Aggies	8	31-20-37	Nov. 17, 1938	3,767	3,542	−225	3,840	15,000	1,383			
Do	9	31-20-37	May 11, 1938	3,770	3,549	−221	3,840	20,834	1,120			
State B	4	29-21-36	June 8, 1935	3,897	3,648	−249	3,925	6,900	620			
Stanolind Oil & Gas Co.:												
Gilluly B	1	25-20-36	Mar. 22, 1939	3,796	3,554	−242	3,854	9,899	[3] 21,430			
Gilluly A	7	24-20-36	Apr. 8, 1939	3,814	3,542	−272	3,858	23,716	[4] 3,561			
Do	13	24-20-36	May 4, 1939	3,818	3,558	−260	3,865	32,456	[5] 1,354			
Sun Oil Co.:												
Akens	3	3-21-36	Aug. 22, 1938	3,789	3,569	−220	3,859	18,400	3,200			
Do	6	3-21-36	June 17, 1938	3,750	3,535	−215	3,834	40,750	1,378			
Tidewater Associated Oil Co.:												
State A	4	8-21-36	Nov. 4, 1935	3,819	3,578	−241	3,887	11,350	1,800			
Shell Oil Co., Inc.:												
State B	1	29-21-36	Mar. 5, 1939	3,910	3,663	−247						Water.
State F	2	6-21-36	Sept. 4, 1938	3,817	3,549	−268						
State G	2	6-21-36	Sept. 3, 1939	3,798	3,554	−244						
State H	1	13-21-35	Apr. 30, 1936	3,906	3,604	−302						
State J	1	32-20-37	June 13, 1936	3,765	3,545	−220						
Continental Oil Co.:												
Reed B	5	23-20-36	May 28, 1938			−239						
Do	1	24-20-36	Mar. —, 1939			−228						
Reed	3	24-20-36	do			−230						
Repollo Oil Co.: State	2	32-20-37	July 8, 1938	3,788	3,546	−242	3,861	56,935	5,193			
Continental Oil Co.:												
Lockhart A	2	30-21-36	June 17, 1935	3,738	3,646	−92						
Lockhart B	2	14-21-36	Aug. 19, 1936	3,806	3,581	−225						
Do	1	31-21-36	Jan. 21, 1936	3,812	3,628	−184						
Lockhart	2	31-21-36	Oct. 1, 1937	3,762	3,622	−140						
Meyer A	1	18-21-26	Jan. 8, 1936	3,785	3,600	−185						
Do	2	18-21-36	Apr. 18, 1935	3,848	3,635	−213						Set on completion.
Meyer B	1	8-21-36	June 2, 1938	3,828	3,591	−237						
Meyer	2	8-21-36	Oct. 1, 1937	3,834	3,583	−251						
Do	3	8-21-36	Sept. 12, 1935	3,835	3,596	−239						
Do	4	8-21-36	Mar. —, 1939	3,800	3,589	−211						
Meyer B	2	9-21-36	Nov. 2, 1935	3,763	3,557	−206						
Meyer	4	9-21-36	Oct. 26, 1935	3,752	3,580	−172						
State C	8	20-21-36	Dec. 29, 1935	3,870	3,656	−214						Do.

State D	1	11-21-36	Sept. 20, 1936	3, 864	3, 601	−263						Do.
State	4	11-21-36	Mar. 5, 1937	3, 790	3, 594	−196						
Gulf Oil Corporation:												
Bell Ramsey	1	9-21-36	Oct. 20, 1936	3, 810	3, 596	−214	3, 910	30, 000	760			
Do	2	9-21-36	June 8, 1936	3, 785	3, 530	−255	3, 840	8, 420	3, 321			
Bell Ramsey, reset	2	9-21-36	May 14, 1939	3, 808	3, 530	−278	3, 840	12, 820	Failed			Packer failed because 6¼ hole below 4¾ casing.
Bell Ramsey	5	9-21-36	Oct. 15, 1935	3, 791	3, 588	−203	3, 868	High	894			Set on completion.
Do	6	9-21-36	Dec. 8, 1935	3, 798	3, 594	−204	3, 896	10, 165	1, 136			Do.
Do	7	9-21-36	Mar. 11, 1936	3, 805	3, 582	−223	3, 895	20, 710	16, 623			Do.
Bell Ramsey, reset	7	9-21-36	Aug. 30, 1936	3, 805	3, 582	−223	3, 895	35, 000	3, 941			
Bell Ramsey	8	9-21-36	July 16, 1936	3, 768	3, 570	−198	3, 890	45, 541	5, 021			Do.
Bell B	1	6-21-36	Nov. 21, 1938	3, 800	3, 586	−214	3, 895	45, 000	6, 100			
Bell	2	6-21-36	Feb. 14, 1936	3, 797	3, 581	−216	3, 885	20, 446	1, 000			Do.
Bell, reset	2	6-21-36	Sept. 28, 1939	3, 792	3, 581	−211	3, 885					
Campbell		7-21-36	Feb. 7, 1937	3, 804	3, 597	−207	3, 900	High	1, 669			Do.
Collins	2	14-21-36	Jan. 27, 1939	3, 780	3, 584	−196	3, 883	25, 900	3, 000			
Felton	1	28-21-36	Oct. 25, 1937	3, 758	3, 602	−156	3, 885	33, 473	9, 833			Do.
Graham St. E	2	6-21-36	Sept. 20, 1936	3, 785	3, 578	−207	3, 885	44, 927	4, 144			Do.
Graham St. E., reset	2	6-21-36	Dec. 20, 1938	3, 803		−225	3, 885	100, 000	2, 460			
Houston	2	7-21-36	May 1, 1936	3, 790	3, 601	−189	3, 886	10, 000	4, 132			
Janda	2	20-21-36	Nov. 24, 1935	3, 814	3, 609	−205	3, 914	(?)	2, 156			Do.
Orcutt	2	5-21-36	Jan. 13, 1936	3, 826	3, 597	−229	3, 895	38, 097	1, 136			Do.
Do	3	5-21-36	Jan. —, 1939	3, 829	3, 587	−242	3, 894	20, 181	1, 835			
Do	4	6-21-36	June 1, 1936	3, 805	3, 592	−213	3, 902	38, 507	2, 333			Do.
Do	5	5-21-36	Sept. 8, 1936	3, 808	3, 587	−221	3, 890	10, 125	1, 027			Do.
Do	6	6-21-36	Nov. 29, 1936	3, 724	3, 573	−151	3, 873	6, 420	2, 148			Do.
Do	1	5-21-36	Sept. 16, 1935	3, 800	3, 590	−210	3, 890	24, 931	1, 684			Do.
Orcutt B	1	5-21-36	Aug. 8, 1938	3, 809	3, 568	−241	3, 865	31, 818	2, 820			Treated below packer with 1,000 gallons acid.
Sunshine	3	30-20-37	Feb. 27, 1937	3, 770	3, 537	−233	3, 837	High	3, 250			
White	1	25-20-36	Dec. 5, 1936	3, 725	3, 543	−182	3, 845	13, 041	2, 892			Do.
Leonard	5	22-21-36	Mar. 10, 1939	3, 721	3, 582	−139	3, 874					Well dead. Flow 76 percent B. S. & W. Flow packer unseated.
Do	3	22-21-36	Oct. 5, 1938	3, 852	3, 597	−255	3, 895					
Leonard, reset	3	22-21-36	Dec. 1, 1939	3, 761	3, 597	−164	3, 895			Pumping	Flowing	Flow packer. Flow valves.
Campbell	1	7-21-36	Oct. 26, 1939	3, 898	3, 622	−276	3, 925			85 percent	50 percent	Increased oil from 117 to 200 B. O. P. D.
Houston	4	7-21-36										
Bell B	2	6-21-36	Sept. 28, 1939	3, 792	3, 581	−211	3, 885					
Sunshine	2	30-20-37	Nov. 28, 1939	3, 772	3, 539	−233	3, 840	54, 720 (?)	Failed			Packer failed because 6¾ hole below 5½ casing.
Orcutt C	3	6-21-36	Dec. 22, 1939	3, 776	3, 562	−214	3, 862	12, 367	4, 283			
Houston	1	7-21-36	Apr. 23, 1935	3, 825	3, 615	−210	3, 917		2, 725			

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[3] 22 barrels oil per day.
[4] 73 barrels oil per day.
[5] 65 barrels oil per day.

Hobbs Pool—Record of packer installation to October 1939

Lease and well No.	Location	Packer date	Packer depth	Subsea		Type packer	Percent water or gas-oil ratio	
				Packer depth	Lime top		Before	After
Amerada Co.:	*S. T. R.*							
Hardin No. 1	18–18–38	August 1935	4, 100	429	386	Water	61 percent	Now 87 percent.
McKinley No. 3	30–18–38	February 1933	4, 075	416	356	Gas	14,000	Now 5,100.
Reset		November 1933	4, 135	476	356	do	5,100	Now 1,385.
State A No. 1	32–18–38	August 1933	4, 056	417	338	do	10,000	Now 1,200.
State A No. 2	32–18–38	March 1934	4, 050	397	312	do	18,000	Now 4,150.
State B No. 2	29–18–38	April 1935	4, 170	519	395	do	7,500	Now 1,142.
State C No. 1	36–18–37		3, 986	331	521	Hookwal		Flow packer.
Cities Service Co.: Hardin No. 1	19–18–38	September 1938	4, 130	469	379	Water	70 percent	Gradually decreasing.
Continental Co.:								
State A No. 1	5–19–38	April 1933	4, 073	465	395	do	30 percent	Before packer well was dead; account of water.
Reset		December 1933	4, 079	459	395	do	4 percent	Now 22 percent.
State A No. 1	33–18–38	October 1935	4, 069	435	356	do	20 percent	
Reset		September 1936	4, 080	446	356	do	45 percent	Now 2.5 precent.
State A No. 5	33–18–38	August 1935	4, 070	437	347	do	8 percent	Now 0 percent.
State A No. 2	33–18–38	June 1933	4, 054	415	321	Gas	10,000	Now 709.
State A No. 4	33–18–38	June 1935	4, 020	380	319	do	8,000	Now 1,877.
State A No. 6	33–18–38	February 1936	4, 085	450	336	Water	4 percent	Now 0 percent.
State A No. 7	33–18–38	January 1933	4, 085	445	366	Gas	25,000	Now 2,711.
State A No. 1	29–18–38	July 1933	4, 121	471	350	do	10,000	
Reset		August 1935	4, 121	471	350	do	12,552	Now 9,711.
State A No. 2	29–18–38	February 1933	4, 034	389	325	do	6,666	Did not hold.
Reset	29–18–38	July 1933	4, 076	431	325	do	6,500	Now 4,898.
State A No. 3	29–18–38	January 1934	4, 129	479	370	do	13,500	Now 3,196.
Getty Co.:								
McKinley No. 2	30–18–38	January 1935	4, 100	449	344	do	56,000	Now 1,923.
McKinley No. 4	30–18–38	October 1934	4, 147	490	358	do	8,206	Now 1,935.
Gulf Co.:								
Graham State No. 4	24–18–37	July 1935	4, 125	451	396	Water	(?)	Now 85 precent unsuccessful. Now removed.
West Grimes No. 4	32–18–38	January 1933	4, 035	395	330	Gas	55,150	Now shut in.
West Grimes No. 7	32–18–38	October 1934	4, 075	436	336	do	4,900	Now 3,467.
West Grimes No. 6	32–18–38	November 1933	4, 045	437	367	Water	29 percent	Gave way December 1933.
Reset	32–18–38	January 1934	4, 055	427	367	do	do	Now 3,001.
East Grimes No. 1	33–18–38	June 1939	4, 064	430	331	Gas	12,000	Shut-off O. K.
East Grimes No. 2	33–18–38	July 1933	4, 066	425	347	do	8,090	Now 1,880.
East Grimes No. 3	33–18–38	Aug. 1934	4, 030	381	317	do	(?)	Now 1,281.
East Grimes No. 4	33–18–38	February 1937	4, 042	400	367	do	10,450	Now 19,149.
Reset		August 1939	4, 077	435	367	do	25,000	Exner Dodge packer.
Hardin No. 1 [2]	18–18–38	March 1935	4, 210	548	403	Water	(?)	Unsuccessful—now unseated.
Hardin No. 2 [3]	18–18–38	September 1935	4, 172	507	475	do	73 percent	S. O. most of oil.
Reset	18–18–38	November 1935	4, 182	517	475	do		SO.-B. H. water now 50 percent.

Hubble Co.:								
Bowers A No. 5	30–18–38	February 1935	4, 123	470	357	Gas	17,800	Now 3.375.
Bowers A No. 4	30–18–38	January 1936	4, 063	417	354	do	5,000	Now 3,017.
Bowers A No. 3	29–18–38	January 1935	4, 105	461	351	do	27,100	Now 2,326.
Bowers A No. 10	29–18–38	June 1934	4, 113	464	346	do	10,000	Did not hold.
Reset	29–18–38	July 1934	4, 146	497	346	do		
Reset	29–18–38	August 1937	4, 146	497	346	do	14,000	High ratio caused by tubing leak; now 888.
Ohio Co.:								
State No. 4	30–18–38	September 1937	4, 180	523	483	Water	Pumping	Now 60 percent.
State No. 1 [4]	32–18–38	March 1934	4, 059	424	325	Gas		Pipe set high.
Reset	32–18–38	May 1935	4, 081	446	325	Water	40 percent	Now (?).
State No. 2	32–18–38	July 1937	4, 080	447	361	do	30 percent	Now 10 percent.
State No. 3	32–18–38	October 1937	4, 050	410	325	do	10 percent	Do.
State No. 5	32–18–38	July 1935	4, 050	423	348	do	(?)	Now 0 percent.
Shell Co.:								
Grimes No. 1	28–18–38	November 1938	4, 061	413	326	Gas	14,000	Now 7,900.
Grimes No. 2	28–18–38	August 1935	4, 110	462	397	do	11,000	
Reset	28–18–38	do	4, 125	477	397	do	20,000	
Reset	28–18–38	August 1937	4, 187	539	397	do	32,000	Now 1,499.
Grimes No. 3	28–18–38	November 1933	4, 089	438	387	do	30,000	
Reset	28–18–38	June 1934	4, 117	481	387	do	14,000	Now 1,341.
Grimes No. 4	28–18–38	September 1934	4, 042	396	331	do	30,000	Now 1,390.
State B No. 1	33–18–38	do	4, 038	387	319	do	8,614	
Reset	33–18–38	December 1938	4, 073	422	319	do	8,980	Well drilled deeper; now 980.
State B No. 2	33–18–38	June 1934	4, 019	372	319	do	20,000	
Reset	33–18–38	June 1938	4, 077	430	319	do	(?)	Now 958.
McKinley A No. 4	19–18–38	December 1932	4, 069	411	352	do	23,000	
Reset	19–18–38	July 1938	4, 132	474	352	do	12,000	Now 1,655.
McKinley B No. 3	20–18–38	September 1935	4, 190	533	476	do	12,460	Now 1,120.
State A No. 3	32–18–38	March 1936	4, 073	437	324	do	7,000	Now 1,200.
Rice No. 1 [5]	13–18–38	May 1935	4, 068	393	363	Water	90 percent	Producing from above packer; now 5 percent.
Rice No. 2 [5]	13–18–38	September 1935	4, 166	488	392	do	do	Producing from above packer; now 38 percent.
Berry No. 4	31–18–38	July 1935	4, 125	485	435	do	95 percent	Now 0.
Berry No. 2	31–18–38	September 1936	4, 152	511	434	do	75 percent	
State D No. 2	24–18–37	May 1938	4, 196	521	376	do	40 percent	Packer caused well to flow; now 87 percent.
McKinley B No. 2 [6]	20–18–38	January 1936	4, 178	529	481	do	90 percent	Now plugged back with cement to 4,178.
Thorpe No. 1	10–19–38	June 1933	3, 970	380	530	Hookwall		Flow packer.

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[1] Gulf Graham State No. 4, packer removed February 1938.

[2] Gulf Hardin No. 1, sec. 18–18–38, was set to shut off bottom water but failed after being acidized above packer. Therefore the packer was pulled up the hole a few feet and left unseated.

[3] Gulf Hardin No. 2, sec. 18–18–38, is producing from above the packer.

[4] Ohio State No. 1, sec. 30–18–38, is producing from above packer.

[5] Shell Rice No. 1 and No. 2, sec. 13–18–38, is producing from above packer.

[6] Shell McKinley B No. 2, sec. 20–18–38, is plugged back with cement and indicated depth.

Hobbs Pool—Record of packer installation to October 1939—Continued

Lease and well No.	Location	Packer date	Packer depth	Subsea		Type packer	Percent water or gas-oil ratio	
				Packer depth	Lime top		Before	After
Samedan Co.:	*S. T. R.*							
Moon A No. 2	28-18-38	November 1935	4, 200	550	517	Gas	4,000	Unsuccessful.
Reset	28-18-38	May 1936	4, 189	539	517	do	6,000	Packer seal June 6, 1936; now 1,109.
Moon B No. 1	28-18-38	July 1936	4, 151	501	476	do	5,800	Now 5,000.
Standard of Texas Co.:								
State No. 3	29-18-38	November 1932	4, 052	404	312	do	49,000	Did not hold.
Reset	29-18-38	October 1933	4, 070	422	312	do	25,000	Now 665.
State No. 4	29-18-38	January 1933	4, 027	381	314	do	34,300	Packer failed later.
Reset	29-18-38	October 1933	4, 070	424	314	do	3,080	Now 1,900.
State No. 2	29-18-38	April 1934	4, 110	460	355	do	125,000	Do.
McKinley No. 1 [7]	20-18-38	November 1936	4, 201	546	509	Water	(?)	Producing from above packer; now 62 percent.
Stanolind Co.:								
Byers No. 8	4-19-38	January 1937	4, 057	431	364	do	30 percent	Now 0 percent.
Byers No. 11	4-19-38	March 1939	4, 057	433	572	do	45 percent	Water gradually decreasing; now 5 percent.
Byers No. 26	4-19-38	June 1939	4, 068	451	395	do	60 percent	Water gradually decreasing.
McKinley No. 1	5-19-38	August 1933	4, 080	452	375	do	85 percent	Now 0 percent.
McKinley, No. 6	5-19-38	December 1934	4, 004	455	396	do	15 percent	Do.
McKinley No. 26	5-19-38	August 1933	4, 077	450	365	do	87 percent	
Reset	5-19-38	June 1938	4, 079	452	365	do	30 percent	Water gradually decreasing.
State No. 3	4-19-38	October 1934	4, 112	509	415	do	68 percent	Packer failed later.
Reset	4-19-38	November 1934	4, 139	532	415	do	(?)	Now 0 percent.
State No. 8	4-19-38	August 1934	4, 090	466	376	do	(?)	Do.
State No. 11	4-19-38	July 1934	4, 092	464	367	do	(?)	Packer seal February 1938 now clean oil.
State No. 33	4-19-39	March 1934	4, 111	497	383	do	(?)	Now 21 percent.
State No. 11	5-19-38	February 1933	4, 128	509	411	do	96 percent	Packer seal in 1938; now clean oil.
State No. 11	9-19-38	April 1937	4, 122	519	462	do	50 percent	Now 0 percent.
State No. 26	33-18-38	November 1933	4, 090	459	364	Gas	5,400	Now 1,550.
Terry No. 8-D	9-18-38	February 1936	4, 140	536	491	Water	90 percent	Now 71 percent.
Turner No. 8-X	34-18-38	March 1935	4, 100	471	369	Gas	21,000	Now 2,294.
Turner No. 11-X	34-18-38	November 1936	4, 081	455	412	do	6,350	Now 1,443.
Turner No. 29	34-18-38	September 1935	4, 104	481	377	do	7,500	Now 1,612.
Turner No. 29-X	34-18-38	October 1935	4, 116	475	375	do	6,000	Now 1,665.
Thorpe No. 26	10-19-38	September 1939	4, 100	494	494	do	11,000	Not successful.
Sun Co.:								
McKinley No. 1	5-19-38	September 1933	4, 038	416	363	Water	30 percent	Now 0 percent.
McKinley No. 2	5-19-38	December 1932	4, 062	444	382	do	50 percent	Do.
McKinley No. 3	5-19-38	March 1933	4, 035	406	356	do	8 percent	Gave way Aug. 4, 1933.
Reset	5-19-38	September 1933	4, 045	416	356	do	40 percent	Now 0 percent.
McKinley No. 4	5-19-38	January 1933	4, 060	437	377	do	8 percent	Do.

Texas Co.:								
McKinley No. 2	5-19-38	October 1932	4,086	474	407	do	95 percent	Same way 1935.
Reset	5-19-38	November 1935	4,086	474	407	do	95 percent	Now 5 percent.
Tidewater Co.:								
Grimes No. 1	29-18-38	July 1933	4,110	463	348	Gas	26,000	Now shut in.
Grimes No. 3	29-18-38	August 1936	4,165	516	386	do	6,100	Now 2,256.

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[7] Standard McKinley No. 1, sec. 20-18-38, is producing from above packer.

Remedial work—Gas and water packers

MONUMENT FIELD

Company lease	Well	Location	Date set	Depth set	Surface elevations	Subsea depth packer	Total depth well	Gas-oil ratio		Percent water		Remarks
								Before	After	Before	After	
Amerada Petroleum Corporation:		*S. T. R.*										
Anderson	1	8-20-37	Nov. 18, 1936	3,824	3,556	−268	3,876	29,200	565			
Do	2	8-20-37	Mar. 9, 1937	3,814	3,552	−262	3,860	125,000	336			
Adkins	1	5-30-37	Sept. 29, 1937	3,843	3,565	−278	3,880	26,300	15,600			
Do	1	5-20-37	Dec. 8, 1938	3,854	3,565	−289	3,880	35,600	16,600			
Andrews	1	12-20-36		3,805	3,547	−258						
Do	2	11-20-36	Jan. 19, 1936	3,805	3,583	−212	3,895	270,000	1,270			
Laughlin	3	9-2-37	July 8, 1938	3,832	3,557	−275	3,856	14,800	4,720			
Do	3	9-2-37	July 29, 1938	3,840	3,557	−283	3,856	4,720	10,562			
Do	3	9-2-37	Sept. 5, 1938	3,846	3,557	−289	3,856	17,000	11,130			
S. Phillips	2	33-19-37		3,750	3,569	−181						Protect formation from input gas.
Phillips	1	1-20-36	Mar. 13, 1936	3,830	3,586	−244	3,900	22,700	7,570			
Do	1	1-20-36	Mar. 17, 1936	3,869	3,586	−283	3,900	7,570	625			
Do	2	1-20-36	May 13, 1936	3,858	3,578	−280	3,890	9,000 M	575			
Do	3	1-20-36	July 8, 1936	3,865	3,580	−285	3,892	No test	380			
Do	4	1-20-36	Apr. 20, 1937	3,855	3,586	−269	3,900	16,500	5,520			
Do	4	1-20-36	Apr. 21, 1937	3,870	3,586	−284	3,900	5,520	362			
State D	1	1-20-36	Mar. 14, 1935	3,929	3,590	−339	3,954			3	0	
Do	3	1-20-36	July 2, 1936	3,850	3,582	−268	3,910	10,650	456			
Do	4	1-20-36	May 30, 1937	3,866	3,586	−280	3,900	10,400	474			
State F	4	36-19-36	May 11, 1937	3,872	3,595	−277	3,905	8,330	645			
State G	1	18-19-37	Mar. 15, 1936	3,943	3,706	−237	4,014	10,000	950			
State H	2	1-20-36	May 14, 1936	3,832	3,573	−259	3,879	8,000M	14,300			
Do	2	1-20-36	May 19, 1936	3,855	3,573	−282	3,879	14,300	400			
State J	1	2-20-36	Jan. 24, 1936	3,815	3,591	−224	3,912	23,800	603			
State R	1	29-19-37	May 30, 1936	3,820	3,618	−202	3,945	29,500	7,000M			
Do	1	29-19-37	do	3,837	3,618	−219	3,945	7,000M	6,000M			
Do	1	29-19-37	May 31, 1936	3,881	3,618	−263	3,945	6,000M	6,250			
State S	2	2-20-36	July 19, 1936	3,830	3,605	−225	3,920	No test	975			
State T	7	28-19-37		3,799	3,634	−165						Do.
State V	1	36-19-36	Aug. 20, 1936	3,845	3,623	−222	3,940	19,700	693			No packer.
Do	3	36-19-36	Apr. 4, 1937	3,863	3,600	−263	3,910	No test	6,566			
Do	3	36-19-36	Apr. 5, 1937	3,892	3,600	−292	3,910	6,566	Low			
State X	1	16-20-37	Apr. 6, 1937	3,818	3,529	−289	3,835	5,220	812			
State Y	2	17-20-37	Apr. 27, 1937	3,830	3,539	−291	3,854	12,000 M	615			
Weir	3	35-19-36	Nov. 21, 1937	3,908	3,626	−282	3,945	9,380	1,137			
Do	4	35-19-36	Sept. 25, 1937	3,865	3,627	−238	3,945	30,631	3,489			
Do	5	35-19-36	Sept. 30, 1937	3,869	3,636	−233	3,955	15,920	4,560			
Do	5	35-19-36	Nov. 7, 1937	3,879	3,636	−243	3,955	20,100	1,109			

Do	7	26-19-36	Jan. 19, 1937	3,928	3,671	−257	3,993	25,000	Swab			
Do	7	26-19-36	Jan. 24, 1937	3,897	3,671	−226	3,993	Swab	Swab dry			Packer removed Jan. 29, 1937.
State Q	2	16-20-37	May 21, 1938	3,828	3,549	−280	3,842	18,870	1,460			
Anderson Prichard Oil Corporation:												
Britt A	1	7-20-37	Apr. —, 1936	3,825	3,575	−250	3,906	7,738	7,738	6	6	
Do	1	7-20-37	do	3,832	3,575	−257	3,906	7,738	500	6		
Do	2	7-20-37	Oct. —, 1936	3,799	3,582	−217	3,890	13,889	5,976			
Do	2	7-20-37	Nov. —, 1936	3,829	3,582	−247	3,905	13,889	500			
Do	7	7-20-37	Mar. —, 1937	3,817	3,556	−261	3,879	6,000	2,500			No packer.
Do	7	7-20-37	Apr. —, 1937	3,826	3,556	−270	3,879	2,500	700			
Britt B	1	5-20-37	Jan. —, 1937	3,781	3,568	−213	3,870	6,313	3,516			To be removed.
Do	1	5-20-37	do	3,810	3,568	−242	3,870	6,313	710			
Do	1	5-20-37	Sept. —, 1938	3,854	3,568	−286	3,870	25,000	17,647			
Do	1	5-20-37	do	3,840	3,568	−272	3,870	17,647	68,181			
Do	1	9-20-37	do	3,830	3,568	−262	3,870	68,181	58,817			
Do	1	5-20-37	do	3,829	3,568	−261	3,870	58,817	28,261			
Cities Service Oil Co.:												
State C	3	16-21-36	July 30, 1936	3,780	3,624	−156	3,851	30,000	8,327			
Laughlin	2	5-20-37	Nov. 12, 1936	3,793	3,568	−225	3,890	10,000	10,000			
Do	2	5-20-37	Feb. 17, 1937	3,818	3,568	−250	3,890	10,000	835			
Ohio Oil Co.:												
Barber	6	5-20-37	Apr. 25, 1939	3,846	3,557	−289	3,890	3M	½M			
Hansen	3	5-20-37	Aug. 17, 1937	3,875	3,552	−323						
Barber	8	5-20-37	Nov. 19, 1938	3,874	3,569	−305	3,900	3M	200,000			
Do	2	5-20-37	May 10, 1939	3,841	3,569	−272	3,894	2M	½M			
Do	4	5-20-37	Nov. 4, 1936	3,822	3,571	−251	3,895	25M	200,000			
St. McGrail	1	26-19-36	Nov. 5, 1938	3,865	3,669	−196	3,990	No result				
Phillips Petroleum Co.: Patsy.	1	18-20-37	Oct. 1, 1938	3,839		−282						
Stanolind Oil & Gas Co.:												
Gilluly B	2	21-20-37	Nov. 6, 1938	3,802	3,526	−276	3,851	58,000	34,850			
Gilluly A	4	24-20-36	Oct. 27, 1937	3,804	3,553	−251	93,619	[1] 3,000				Acidized with 500 gallons Dec. 21, 1937, and Fibrex pumped in Sept. 2, 1938. Ratio B/9091-A/3990, at 30 barrels per day.
Sun Oil Co.:												
Maveety	1	35-19-36	May 30, 1936	3,880	3,595	−285	3,935	15,200	2,080			
Do	5	35-19-36	Feb. 22, 1937	3,835	3,613	−222	3,940	57,800	3,300			
Do	6	35-19-36	May 12, 1937	3,885	3,641	−243	3,972	54,500	Estimated 500.			Pumped after packer set.
The Texas Co.:												
Cook	1	32-19-37	Mar. 19, 1937	3,763	3,602	−161	3,929	7,800	1,735			
Cooper	1	5-20-37	Aug. 27, 1926	3,800	3,559	−241	3,890	6,700	1,833			
Mattern	1	20-19-37	Jan. 18, 1936	3,837	3,637	−200	3,965	2,626	1,680			
Do	4	20-19-37	Nov. 25, 1936	3,808	3,655	−153	3,982	1,500	1,212			
Phillips	1	6-20-37	Mar. 26, 1936	3,868	3,575	−293	3,908	2,000	508			
Do	2	6-20-37	May 11, 1936	3,826	3,573	−253	3,890	1,950	1,207			
Do	3	6-20-37	June 12, 1936	3,826	3,576	−250	3,896	3,000	1,248			
Do	4	6-20-37	Oct. 4, 1936	3,830	3,574	−256	3,910	2,400	1,200			

Remedial work—Gas and water packers—Continued

MONUMENT FIELD—Continued

Company lease	Well	Location	Date set	Depth set	Surface elevations	Subsea depth packer	Total depth well	Gas-oil ratio		Percent water		Remarks
								Before	After	Before	After	
The Texas Co.—Continued.		*S. T. R.*										
Sanders	3	18-19-37	June 8, 1937	3, 944	3, 706	−238	4, 010	6,317	1,318			
Do	2	18-19-37		3, 860	3, 710	−150						
State E	3	1-20-36	Jan. 23, 1936	3, 802	3, 583	−219	3, 910	1,900	507			
State F	1	24-19-36	Nov. 29, 1935	3, 910	3, 695	−205	4, 020	620	620			
Do	2	24-19-36		3, 868	3, 698	−170						
State J	1	24-19-36	July 27, 1938	3, 892	3, 702	−190	4, 050	37,000	1,490			
Do	2	24-19-36	Feb. 24, 1937	3, 810	3, 713	−97	4, 043	6,055	2,350			
Weir	2	23-19-36	July 4, 1939	3, 923	3, 712	−213	4, 046	104,000	5,820			
St. H Aggies	1											In casing.
Do	4											Do.
Do	5											Do.
St. H Lieu	7											Do.
Do	9											Do
Do	12											Do.
Do	18	19-20-37	June 7, 1939	3, 737	3, 545	−192	3, 870	14,000	1,630			
St. H Universal	10	19-20-37	June 19, 1937	3, 740	3, 548	−192	3, 878	13,000	1,870			
Do	10	19-20-37	June 8, 1938	3, 740	3, 548	−192	3, 878	17,100	1,550			
Tidewater Association Oil Co.:												
Anderson	1	8-20-37	Oct. 25, 1938	3, 845	3, 545	−300	3, 877	11,000	4,130	0	17	
Do	2	8-20-37	June 14, 1938	3, 827	3, 542	−285	3, 880	12,541	600			
State I	2	16-20-37	Mar 19, 1937	3, 840	3, 530	−310	3, 860			28	0	
State J	1	17-19-37	May 4, 1937	3, 980	3, 706	−274	4, 034	3,333	2,480			
Skelly Oil Co.:												
State D	1	1-20-36	Jan. 15, 1936	3, 809	3, 569	−240						
Do	2	1-20-36	May 22, 1936	3, 850	3, 575	−250						
Continental Oil Co.:												
Britt A	1	6-20-37	Aug. 14, 1937	3, 864		−293						
Do	2	6-20-37	July 1, 1936	3, 845		−272						
Britt B	1	8-20-37	Feb. 25, 1937	3, 810		−244						
Do	4	15-20-37	Feb. 18, 1939	3, 819		−266						
Do	1	18-20-37	Feb. 15, 1937	3, 820		−265						
Do	5	18-20-37	June 17, 1937	3, 824		−279						
Reed A	1	3-20-36	Apr. 17, 1936	3, 862		−240						
Do	2	3-20-36	June 27, 1936	3, 864		−245						
Sanderson A	3	11-20-36	Mar. 29 1937	3, 793		−222						
Sanderson B	1	10-20-36	Jan. 21, 1937	3, 825		−225						
State A	1	19-19-37	Nov. 28, 1938	3, 954		−271						
State C	2	16-20-37	Dec. 24, 1938	3, 811		−272						

Repollo Oil Co.:												
Barber	4	8-20-37	Sept. 24, 1938	3,843		−277						
Do	7	8-20-37	Nov. 28, 1938	3,842		−280						
Phillips A	4	31-19-37	May 10, 1938	3,885		−294						
Phillips B	3	31-19-37	Aug. —, 1936	3,890	3,585	−305						
Superior Oil Co.: State	2	2-20-36		3,800	3,603	−197						
Gulf Oil Corporation:												
Whitmire	1	8-20-37	Oct. 25, 1936	3,820	3,557	−263	3,882	High	2,900			Packer set on completion.
Whitmire reset	1	8-20-37	June 5, 1939									Attempted to reset but packer stuck.
Do	2	8-20-37	Nov. —, 1938	3,855	3,566	−289	3,891	7,000	3,000			
Do	3	8-20-37	Mar. 28, 1937	3,834	3,555	−279	3,880	4,550	3,740			Packer set on completion
Do	4	8-20-37	Apr. —, 1939	3,832	3,556	−276	3,881	61,923	3,030			
Weir B	1	26-19-36	Feb. 25, 1937	3,879	3,671	−208	3,995	23,330	1,380			Do.
Weir reset	1	26-19-36	Sept. 20, 1938	3,905	3,671	−234	3,995	25,000	Very low			
Weir	1	35-19-36	Aug. 27, 1939	3,925	3,633	−292	3,978	41,170	383			
Graham St. C	6	25-19-36	Nov. 22, 1936	3,948	3,631	−317	3,998	(?)	570			Do.
Do	3	24-19-36	June 5, 1936	3,895	3,713	−182	4,030	High	906			Do.
Graham F	1	36-19-36	June 20, 1936	3,682	3,584	−278	3,900	11,025	942			Do.
Do	2	36-19-36	Feb. 15, 1936	3,875	3,590	−285	3,908	High	1,293			Do.
Matthews	1	6-20-37	May 5, 1936	3,773	3,567	−206	3,884	2,250	1,500			Do.
Do	2	6-20-37	July 13, 1936	3,806	3,576	−230	3,885	(?)	3,247			Do.
Do	3	6-20-37	Sept. 9, 1936	3,828	3,567	−261	3,891	11,190	4,720			Do.
Martin	2	25-19-36	Sept. 17, 1936	3,830	3,624	−206	3,953	9,914	1,290			Do.
Culp	1	19-19-37	Sept. 23, 1935	3,905	3,687	−218	3,970	4,253	1,512			Do.
Anderson	4	17-20-37	Dec. 24, 1939	3,810	3,545	−265	3,870	13,460	485			
Weir reset	1	35-19-36	Jan. 9, 1940	3,911	3,633	−278	3,978	Deadflowing.				
Cities Service Oil Co.:												
Closson	1	6-22-36	July 31, 1935	3,751	3,573	−178	3,830	64,000	78,000			
Do	1	6-22-36	Oct. 11, 1935	3,745	3,573	−172	3,830	60,000	60,000			
Do	1	6-22-36	Feb. 5, 1937	3,752	3,573	−179	3,830	60,000	10,000			
Do	2	6-23-36	May 3, 1937	3,780	3,581	−199	3,861	26,500	1,150			
Do	3	6-22-36	Aug. 22, 1937	3,755	3,591	−164	3,830	20,000	2,750			
Closson A	1	18-22-36	Dec. 20, 1937	3,744	3,588	−156	3,814	(?)	1,483			
Ohio Oil Co.:												
St. McDonald	1	15-22-36	Mar. 12, 1934	3,887	3,563	−324	3,887			12	8	
Do	1	15-22-36	do	3,680	3,563	−117	3,887	25M	50,000			
Tidewater Associated Oil Co.:												
Day	1	6-22-36	June 28, 1937	3,780	3,575	−205	3,851	9,470	1,420			
Do	2	6-22-36	Mar. 7, 1938	3,781	3,573	−208	3,848	33,000	Very little gas.	5	5	

Dates of first water production on proration records

EUNICE FIELD

Company lease	Well	Location	Barrels of water, October 1939	Shows month water started and amount produced during month			
				1936	1937	1938	1939
Amerada Petroleum Corporation:		*S. T. R.*					
State W	1	30-20-37	1.252			Feb. 56	
Do	2	30-20-37	770		July 3.069		
Atlantic Refining Co.:							
State B	2	8-21-36	78		Aug. 78		
State G	1	5-21-36	46			June 15	
State K	2	6-21-36	382			Apr. 200	
State L	2	22-21-36	366			Mar. 230	
State O	2	32-20-37	461		Sept. 237		
Cities Service Oil Co.:							
Felton	1	28-21-36	133	Mar. 330			
State D	1	32-21-36	958	Aug. 62			
Do	3	32-21-36	1,895		Jan. 175		
State F	1	30-20-37	75			Dec. 52	
Do	2	30-20-37	75			Dec. 51	
Do	3	30-20-37	74				Jan. 42
State G	1	2-21-36	44				Feb. 21
Do	2	2-21-36	93			Dec. 33	
State D	2	32-21-36		June 50			
Do	4	32-21-36			Mar. 616		
Continental Oil Co.:							
Lockhart A	1	18-21-36	325	Jan. 635			
Do	2	18-21-36	890	Aug. 29			
Do	3	18-21-36	1,138	Sept. 4			
Do	5	18-21-36	639	Oct. 22			
Do	1	30-21-36	310	Jan. 1,162			
Do	2	30-21-36	775	Jan. 335			
Do	3	30-21-36	2.480	Jan. 238			
Do	4	30-21-36	6,550	Dec. 15			
Do	5	30-21-36	257		Dec. 97		
Do	6	30-21-36	193		Nov. 845		
Lockhart B	1	13-21-36	1,237				Jan. 54
Do	3	14-21-36	260				Jan. 77
Do	5	14-21-36	1,211			Sept. 268	
Do	6	14-21-36	377			Sept. 235	
Do	2	28-21-36	64			Dec. 54	
Lockhart A	4	18-21-36				Jan. 199	
Lockhart B	5	28-21-36		June 5,800			
Do	4	28-21-36	131	Apr. 141			
Do	1	31-21-36	310	Jan. 628			
Do	3	31 21-36	298				Apr. 58
Do	4	31-21-36	1,232				Sept. 298
Meyer A	2	17-21-36	61	Sept. 19			
Do	4	17-21-36	122	Jan. 389			
Do	2	18-21-36	9,300	Sept. 9			
Do	4	18-21-36	1,550	Sept. 9			
Do	5	18-21-36	186	Nov. 64			
Do	6	18-21-36	12.400	Sept. 14			
Meyer B	13	4-21-36	310	Aug. 7			
Do	14	4-21-36	248	Oct. 141			
Do	1	18-21-36	13,175	Oct. 119			
Do	2	18-21-36	46.500	Sept. 36			
Do	3	18-21-36	186	Dec. 383			
Reed B	6	23-20-36	31				Feb. 34
State C	2	20-21-36	339			July 61	
State D	4	15-21-36	370			June 151	
Do	8	15-21-36	1,192			June 260	
Meyer A	3	17-21-36		Sept. 685			
Do	5	17-21-36		Jan. 367			
Do	1	18-21-36		Aug. 18			
Do	2	8-21-36		Oct. 45			
Do	3	8-21-36		Sept. 30			
Do	1	9-21-36		Aug. 15			
Do	2	9-21-36		Jan. 68			
Do	4	9-21-36		Jan. 224			
Do	1	17-21-36		Sept. 11			
Do	2	17-21-36		Sept. 4			
Elliott, L. E.: State A	1	26-20-36	600				Sept. 841
Gulf Oil Corporation:							
Bell	1	8-21-36	55		Sept. 73		
Bell C	1	15-21-36	126		Sept. 28		
Bell D	1	6-21-36	87				July 44
Do	2	6-21-36	130				June 144
Butler	1	19-20-37	118		Aug. 49		
Campbell	1	7-21-36	1,784			May 122	
Do	3	7-21-36	180		Sept. 20		

Dates of first water production on proration records—Continued

EUNICE FIELD—Continued

Company lease	Well	Location	Barrels of water, October 1939	Shows month water started and amount produced during month			
				1936	1937	1938	1939
Gulf Oil Corporation—Continued.							
Collins	4	14-21-36	164		June 149		
Felton	1	28-21-36	783				May 446
Houston	3	7-21-36	760			Dec. 208	
Janda B	1	32-21-36	9, 455	Nov. 249			
Leouard	1	22-21-36	167			Feb. 33	
Do	2	22-21-36	224			Feb. 26	
Do	3	22-21-36	3, 815		Feb. 506		
Do	4	22-21-36	17, 063		Sept. 3, 045		
Do	5	22-21-36	3, 870		Oct. 25		
Orcutt C	3	7-21-36	31				Feb. 20
Do	4	6-21-36	31				Feb. 18
Ramsey	2	27-21-36	288			June 265	
Arn. Ram. C	3	21-21-36	1, 170		Jan. 33		
Do	5	21-21-36	3, 984	Apr. 218			
Do	8	21-21-36	371		Jan. 69		
Do	12	21-21-36	340		Dec. 60		
Arn. Ram. D	1	33-21-36	8, 711	May 28			
Do	2	33-21-36	5, 606			Dec. 4, 670	
Bell Ramsey	1	9-21-36	32	Aug. 1, 438			
Do	5	9-21-36	123			Dec. 37	
Do	7	9-21-36	81	July 255			
Do	9	9-21-36	55	Oct. 868			
Do	10	9-21-36	81	Oct. 540			
White	4	25-20-36	356			Oct. 45	
White B	1	35-20-36					Jan. 26
Humble Oil & Refining Co.:							
Adkins	4	10-21-36	95				Apr. 102
Do	5	10-21-36	242			Jan. 403	
Do	7	10-21-36	165				July 103
Fopeano	2	35-20-36	107			May 186	
State B	1	29-21-36	992	Jan. 485			
Do	2	29-21-36	165			Aug. 1. 209	
Do	3	29-21-36	1, 488	Apr. 570			
Do	4	29-21-36	95			Sept. 2, 100	
Do	5	29-21-36	5, 953		Nov. 250		
Do	6	29-21-36	13, 394		Oct. 120		
Do	7	29-21-36	62			Dec. 81	
Do	8	29-21-36	3, 472	Mar. 365			
Do	9	29-21-36	2, 232			May 93	
State C	1	23-21-36	94				Mar. 64
Ohio Oil Co.: McDonald	1	15		May 311			
Landreth Products Corporation:							
State D	1	2-21-36	72				Oct. 72
Do	2	2-21-36	72				Oct. 72
State C	1	2-21-36	72				July 1,002
Peerless Oil & Gas Co.: State	1	29-21-36	59	Apr. 192			
Phillips Petroleum Co.							
Hudson	1	30-20-37	96		July 109		
Quapaw	1	19-20-37	23		July 74		
New	1	26-20-36					June 186
Do	2	26-20-36					July 12
Repollo Oil Co.:							
Adkins	1	9-21-36	78				Sept. 66
Do	3	9-21-36	30				Sept. 26
Do	4	9-21-36	78				Sept. 66
Do	5	9-21-36	78				Sept. 66
Do	6	9-21-36	129				Sept. 119
Do	7	9-21-36	30				Oct. 30
Berryman	1	11-21-36	43				Sept. 51
Brownlee	1	25-21-36	5, 320			Sept. 2, 162	
State "176"	5	19-20-37	5, 937			Jan. 128	
Do	6	19-20-37	263			Jan. 60	
Do	7	19-20-37	2, 789				Oct. 2, 789
State "196"	2	32-20-37	147		Sept. 451		
White	1	24-20-36	362				Feb. 88
I. A. White	1	35-20-36	203				Feb. 88
Boyd	1	23		June 141			
State "176"	2	19-21-36			July 208		
Do	4	19-21-36			July 164		
Do	3	19-21-36			Sept. 14,774		
Rush:							
State	1	20-20-37	24			July 37	
Do	2	20-20-37				Aug. 20	

Dates of first water production on proration records—Continued

EUNICE FIELD—Continued

Company lease	Well	Location	Barrels of water, October 1939	Shows month water started and amount produced during month			
				1936	1937	1938	1939
Shell Oil Co., Inc.:							
Coleman	1	17-21-36	171	Jan. 133			
Do	2	17-21-36	64		Aug. 25		
Devonian	1	20-21-36	128	Mar. 250			
Do	2	20-21-36	64	Mar. 75			
State A	1	12-21-36	202	Aug. 80			
Do	2	12-21-36	50		Mar. 65		
State B	1	29-21-36	489		Feb. 117		
State C	1	24-21-36	567	May 100			
State E	1	6-21-36	193			Aug. 62	
State F	1	6-21-36	115				Feb. 90
Do	2	6-21-36	776		June 803		
State G	2	6-21-36	460		Aug. 62		
State H	1	13-21-35	380	July 256			
State J	2	32-20-37	30		Feb. 28		
State L	1	1-21-35	105				Sept. 95
Do	2	1-21-35	148			Jan. 20	
State M	4	1-21-35	1,212			Mar. 186	
State C	2	24-21-36					Mar. 124
Skelly Oil Co.: Harrison	1	5		Apr. 150			
Standard Oil Co. of Texas:							
Meredith	2	19-21-36	13,078		July 124		
Do	3	19-21-36	339		Sept. 26		
Stanolind Oil & Gas Co.:							
State C "11"	1X	2-21-36	57			Sept. 34	
State C	2	2-21-36	50			Feb. 176	
McQuatters	1	11-21-36				Feb. 58	
Sun Oil Co.:							
Akens	1	3-21-36	645		Apr. 169		
Do	2	3-21-36	168				June 177
Do	4	3-21-36	79		Sept. 24		
Samedan Oil Corporation:							
Marshall	1	12-21-35			Mar. 108		
The Texas Co.:							
Rector	1	30-21-36	13,506			Feb. 662	
Do	2	30-21-36	12,514	Apr. 182			
Do	3	30-21-36	28,625		Nov. 373		
Do	4	30-21-36	2,070			Oct. 537	
Aggies H	5	31-20-37					Feb. 375
St. H. Lieu	12	20-20-37	713		Sept. 1,035		
Alexander	1	7		July 390			
Aggies H	2	31-20-37				Mar. 19	
Do	1	31-20-37					Feb. 11,173
Do	4	31-20-37					Feb. 15,988
Tidewater Association Oil Co.:							
Coleman	1	17-21-36	48	Aug. 6			
Do	3	17-21-36	32			Feb. 19	
St. Foster	1	8-21-36	45	Feb. 400			
Do	3	8-21-36	30		July 50		
Do	4	8-21-36	75		Feb. 13		
State G	1	21-21-36	360		June 13		
Coleman	4	17-21-36				May 17	
The Texas Co.: Rector	12	20-20-37					Feb. 737
Two States Drilling Co.: Atha	1	31-21-36					Mar. 300

MONUMENT POOL

Company lease	Well	Location	Barrels of water, October 1939	1936	1937	1938	1939
Amerada Petroleum Corporation:							
Larsen	2	32-19-37	75		Dec. 83		
Love	1	32-19-37	18			July 28	
S. Phillips	2	33-19-37	297				Jan. 330
State D	2	1-20-36	27		Aug. 433		
State F	2	36-19-36	380	Jan. 242			
State G	2	18-19-37	36			Apr. 21	
State K	1	29-19-37	75		July 38		
Do	2	29-19-37	483	July 141			
State L	1	20-19-37	28			Feb. 14	
State Q	1	16-20-37	550		June 159		
Do	2	16-20-37	426			July 13	
State R	1	29-19-37	367		July 44		
Do	2	29-19-37	216		Aug. 21		
State S	2	2-20-36	13		July 55		

Dates of first water production on proration records—Continued

MONUMENT POOL—Continued

Company lease	Well	Location	Barrels of water, October 1939	Shows month water started and amount produced during month			
				1936	1937	1938	1939
Amerada Petroleum Corporation—Continued.							
State T	2	25-19-36	150	Oct. 113			
Do	3	25-19-36	3, 430		Feb. 6048		
Do	4	25-19-36	32			Jan. 66	
Do	5	20-19-37	13				Mar. 14
Do	6	20-19-37	70			Jan. 8	
Do	7	28-19-37	23			Dec. 28	
Weir	8	35-19-36	630		Aug. 370		
Weir B	2	26-19-36	44		Nov. 635		
Cities Service Oil Co.: Persons	1	27-19-36	9			Dec. 12	
Continental Oil Co.:							
Britt B	1	10-20-37	4, 800			Jan. 47	
Do	2	10-20-37	6, 000				Mar. 4, 940
Do	1	15-20-37	774			June 118	
Do	6	18-20-37	126		Sept. 664		
Do	7	18-20-37	26		Nov. 20		
Reed A	2	3-20-36	186			Aug. 27	
Do	3	3-20-36	319				Apr. 54
Do	4	3-20-36	200			Aug. 17	
Do	5	3-20-36	1, 860		Jan. 310		
Sanderson A	6	11-20-36	186		Dec. 72		
Sanderson B	1	10-20-36	1. 040			Nov. 28	
Do	2	10-20-36	2, 480		Oct. 34		
Do	3	10-20-36	704			July 251	
Do	4	10-20-36	990			Aug. 600	
State A	1	26-19-36	107		Apr. 46		
Do	2	26-19-36	75		Oct. 116		
Do	3	26-19-36	30		Nov. 80		
Great Western Oil Co.: Bordages	2	33-19-37	30		Sept. 49		
Ohio Oil Co.:							
McGrail	1	26-19-36	165		Dec. 40		
Do	2	26-19-36	136			Jan. 43	
Phillips Petroleum Co.: Mexico	1	18-20-37	996				
Repollo Oil Co.:							
Barber	2	7-20-37	184			Sept. 75	
Do	4	8-20-37	30				Sept. 27
Do	7	8-20-37	95				Sept. 81
Bordages	1	29-19-37	104			Aug. 30	
Byrd	2	11-20-36	364		June 305		
Do	4	11-20-36	380				Mar. 590
Williams	1	33-19-37	135		Jan. 135		
Do	2	33-19-37	440		July 331		
Shell Oil Co., Inc.:							
Foster	1	34-19-36	7				
Do	2	34-19-36	995				Mar. 324
State A	1	35-19-36	139		Feb. 146		
State C	1	24-19-36	75	Apr. 135			
Do	2	24-19-36	3, 647	Mar. 420			
State D	1	19-19-37	3	Aug. 1, 290			
State E	1	13-20-36	3				
Do	2	13-20-36	3				
Do	3	13-20-36	3				
Do	4	13-20-36	3				
State F	1	29-19-37	3				
State G	1	16-20-37	6				
State H	1	20-19-37	56		Feb. 200		
Skelly Oil Co.:							
Monstate	1	13-19-36	206	Jan. 29			
Do	2	13-19-36	462		Dec. 566		
Sun Oil Co.:							
Maveety	2	35-19-36	17				
Do	3	35-19-36	83				
The Texas Co.:							
State J	2	24-19-36	646		July 96		
Weir	2	23-19-36	20		Nov. 50		
Tidewater Associated Oil Co.:							
Anderson	1	8-20-37	342			Dec. 323	
State J	3	17-19-37	48		Dec. 46		
State K	1	13-20-36	52			Jan. 89	
Two States Drilling Co.:							
Etcheverry	1	10-20-36	105				Mar. 312
Do	2	10-20-36	4				Mar. 12

Dates of first water production on proration records—Continued

MONUMENT POOL—Continued

Company lease	Well	Location	Barrels of water, October 1939	Shows month water started and amount produced during month			
				1936	1937	1938	1939
Skelly Oil Co.:							
State E	1	29-19-37					June 1,011
Do	2	29-19-37					June 847
Amerada Petroleum Corporation:							
Haney	1	33-19-37			Nov. 85		
S. Phillips	2	26-19-36			Nov. 597		
Weir B	1	26-19-36			Nov. 15,150		
Larsen	4	32-19-37				Dec. 15	
Andrews	2	11-20-36					July 229
Shell Oil Co., Inc.: Maveety	3	35-19-36					Mar. 98
Continental Oil Co.:							
Britt A	2	6-20-37		Aug. 194			
Britt	2	6-20-37			Mar. 169		
Britt B	5	18-20-37				Dec. 165	
State A	1	7-19-37				Feb. 20	
Stanolind Oil & Gas Co.: Gilluly B	2	21-20-36					Feb. 857
Humble Oil & Refining Co.:							
Laughlin	1	4-20-37			Jan. 41		
State D	1	20-19-37			Jan. 7		
Do	2	20-19-37			Mar. 90		
State E	1	21-19-37			Jan. 5		
Ohio Oil Co.:							
Laughlin	4	9-20-37			Dec. 185		
Hansen	3	16-20-37			Dec. 105		
The Texas Co.:							
State E	2	1-20-36		Apr. 52			
St. Lieu Ld	11	20-20-37			July 171		
St. Univ	10	19-20-37			Dec. 71		
State C	5	4-20-36				Jan. 22	
State E	2	4-20-36					Mar. 106
Sun Oil Co.:							
Maveety	3	35-19-36		Jan. 245			
Do	2	35-19-36					Apr. 19
General Crude Oil Co.: State	1	16-20-37			Sept. 360		
Oil Well Drilling Co.:							
Klingsmith	1	20-19-37			Oct. 17		
State A	1	29-19-37				Jan. 50	
Do	2	29-19-37				Mar. 52	
Tidewater Associated Oil Co.: State K	2	13-20-36			Aug. 112		
Great Western Prod. Co.: State C	1	7-19-37			Aug. 80		
Repollo Oil Co.: Byrd	5	11-20-36				Jan. 232	
Gulf Oil Corporation:							
Hatchett	1	35-19-37	45		Jan. 48		
Do	2	35-19-37	311			Apr. 188	
Kutter A	1	20-19-37	31	Oct. 64			
Do	2	20-19-37	158		Jan. 172		
Kutter B	2	8-19-37	150	Dec. 95			
Love	1	32-19-37	31	Dec. 4			
Do	2	32-19-37	62	Dec. 7			
Matthews	2	6-20-37	93	Dec. 58			
Do	3	6-20-37	94	Dec. 6			
Smith	1	34-19-36	2,009	Dec. 8			
Weir	1	35-19-36	171	Oct. 112			
Weir B	1	26-19-36	28			Jan. 103	
Whitmire	1	8-20-37	31			May 3	
Do	2	8-20-37	105			May 5	
Do	3	8-20-37	94			Sept. 33	
Do	4	8-20-37	31			May 2	
Williams	1	29-19-37	29	Aug. 262			
Graham St. C	2	24-19-36		Oct. 117			
Luthy	1	29-19-37		Dec. 14			
Phillips	1	31-19-37		Dec. 9			
Smith	2	34-19-56		July 54			
Bell G	2	13-30-56				Nov. 860	
Kyte	2	7-19-37				July 5	
Do	1	7-19-37				Nov. 29	
Williams	2	29-19-37				Apr. 25	
Bates	1	26-19-36					June 6

FIELD SUMMARY

Field producing horizon	Cooper limestone	Date	Corbin sandstone	Date	Eaves limestone	Date
Age	10 years		2 years		11	
Number producing acres.	3,720	Jan. 1, 1940	40	Jan. 1, 1940	800	Jan. 1, 1940
Number oil wells	93	do	1	do	20	Do.
Flowing	45	do	0	do	11	Do.
Pumping	20	do	1	do	1	Do.
Gas lift	28	do	0	do	8	Do.
Number gas wells	4	do	0	do	4	Do.
Average gas-oil ratio	13,740	Nov. 1, 1939	0	do	3,342	Nov. 1, 1939
Average gas-fluid ratio.	796	do	0	do	735	Do.
Daily oil production	3.925	do	40	do	860	Do.
Daily gas production	53,929M [1]	do	0	do	28.74M [3]	Do.
Daily water production.	63,630	do	0	do	3,007	Do.
Type of gas	Sour	do	Sweet	do	Sour	Do.
Number remedial work jobs.	33	do	0	do	3	Do.
Total oil, 1939	1, 379, 601		1, 369		295,587	
Total gas, 1939	18,955,718M [2]		None		987,852M [4]	

[1] Including input gas for gas-lift+2.288M from gas wells=56.217M total gas daily.

[2] + 835,120M from gas wells=19,790,838M total gas yearly.

[3] Total gas=2,874M from oil wells=4,113M from gas wells, total 6,987M.

[4] 987,852M from oil wells, 1,501,245M from gas wells, total 2,489,097M.

Field producing horizon	Eunice limestone	Date	Halfway limestone	Date	Hardy limestone	Date
Age	11 years		1 year		4	
Number producing acres.	19,680	Jan. 1, 1940	80	Jan. 1, 1940	4, 400	Jan. 1, 1940
Number oil wells	492	do	2	do	110	Do.
Flowing	453	do	0	do	94	Do.
Pumping	16	do	2	do	16	Do.
Gas lift	23	do	0	do	0	Do.
Number gas wells	4	do	0	do	0	Do.
Average gas-oil ratio	5,653	Nov. 1, 1939		do	2,625	Nov. 1, 1939
Average gas-fluid ratio.	3,926	do		do	2,575	Do.
Daily oil production	22,764	do	80	do	3,260	Do.
Daily gas production	128,684M	do		do	8,557M	Do.
Daily water production.	9,480	do		do	43	Do.
Type of gas	Sour	do		do	Sour	Do.
Number remedial work jobs.	65	do		do	4	Do.
Total oil, 1939	7,891,771		None		1,045,814	
Total gas, 1939	44,612,181M		None		2,745,261M	

Field summary—Continued

Field producing horizon	Hobbs limestone	Date	Jal limestone	Date	Langlie sand	Date
Age	10 years		11 years		11 years	
Number producing acres.	10,080	Jan. 1, 1940	920	Jan. 1, 1940	5,040	Jan. 1, 1940
Number oil wells.	252	do	23	do	126	Do.
Flowing	228	do	10	do	122	Do.
Pumping	15	do	10	do	3	Do.
Gas lift	9	do	3	do	1	Do.
Number gas wells.		do	7	do	10	Do.
Average gas-oil ratio.	1,882	Nov. 1, 1939	5,533	Nov. 1, 1939	3,750	Nov. 1, 1939
Average gas-fluid ratio.	997	do	200	do	1,950	Do.
Daily oil production.	13,120	do	503	do	5,750	Do.
Daily gas production.	24,691M	do	2,783M [1]	do	21,562M [2]	Do.
Daily water production.	12,500	do	13,452	do	5323	Do.
Type of gas	Sour	do	Sour	do	Sweet	Do.
Number remedial work jobs.	81	do	3	do	8	Do.
Total oil, 1939	4,449,808		206,955		1,763,206	
Total gas, 1939	8,374,539M		1,145,082M [3]		6,612,023M [4]	

[1] +18,369M from gas wells.
[2] +12,319M from gas wells.
[3] +6,704,685M from gas wells per year.
[4] 4,496,435M from gas wells yearly.

Field producing horizon	Lynch and North Lynch limestone	Date	Lynn limestone	Date	Mattis sandstone	Date
Age	11 years		10 years		5 years	
Number producing acres.	520	Jan. 1, 1940	1,040	Jan. 1, 1940	4,320	Jan. 1, 1940
Number oil wells	13	do	26	do	133	Do.
Flowing		do	23	do	123	Do.
Pumping	13	do	2	do	8	Do.
Gas lift		do	1	do	2	Do.
Number gas wells		do	6	do	7	Do.
Average gas-oil ratio.		Nov. 1, 1939	2,036	Nov. 1, 1939	3,404	Nov. 1, 1939
Average gas-fluid ratio.		do	998	do	3,335	Do.
Daily oil production.	609	do	956	do	4,938	Do.
Daily gas production.		do	1,946M [1]	do	16,808M [2]	Do.
Daily water production.	3,407	do	980	do	92	
Type of gas		do	Sour	do	Sweet	
Number remedial work jobs.		do	1	do	7	
Total oil, 1939	194,062		271,593		1,480,892	
Total gas, 1939			552,963M [3]		5,040,956M [4]	

[1] +6,666M from gas wells.
[2] +8,399M from gas wells.
[3] +2,433,090M from gas wells.
[4] +3,065,635M from gas wells.

Field summary—Continued

Field producing horizon	Monument limestone	Date	Penrose sand and limestone	Date	Rhodes sandstone	Date
Age	5 years		4 years		12	
Number producing acres.	19,720	Jan. 1, 1940	6,600	Jan. 1, 1940	120	Jan. 1, 1940
Number oil wells	493	do	165	do	3	Do.
Flowing	481	do	139	do	1	Do.
Pumping	8	do	19	do	2	Do.
Gas lift	4	do	7	do		Do.
Number gas wells	1	do		do	10	Do.
Average gas-oil ratio.	3,291	Nov. 1, 1939	4,746	Nov. 1, 1939	200	Nov. 1, 1939
Average gas-fluid ratio.	3,093	do	4,698	do	200	Do.
Daily oil production.	23,299	do	4,727	do	95	Do.
Daily gas production.	76,677 M	do	22,434M	do	0 [1]	Do.
Daily water production.	1,320	do	43	do	4	Do.
Type of gas	Sour	do	Sweet and sour.	do	Sweet	Do.
Number remedial work jobs.	115	do	10	do		Do.
Total oil, 1939	7,739,445		1,619,873		35,159	
Total gas, 1939	25,470,513 M.		7,687,917 M		7,031 M [2]	

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[1] +20,907 M from gas wells daily.
[2] +7,631,055 M from gas wells yearly.

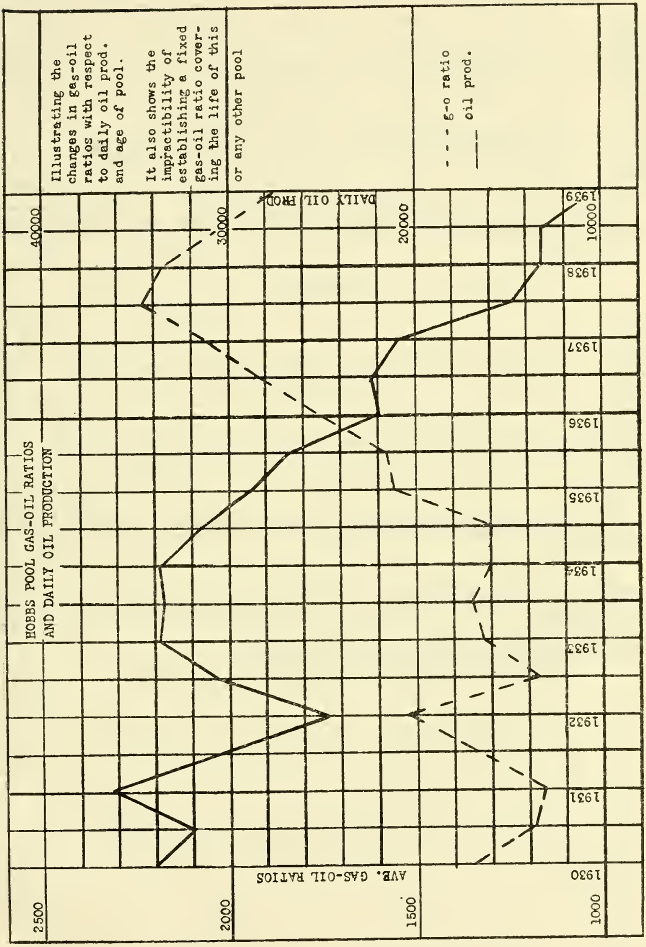
Field producing horizon	Skaggs limestone	Date	Skelly sandstone	Date	South Eunice limestone	Date
Age	4		5 years		9 years	
Number of producing acres.	120	Jan. 1, 1940	2,900	Jan. 1, 1940	4,600	Jan. 1, 1940
Number of oil wells.	3	do	58	do	100	Do.
Flowing	1	do	40	do	96	Do.
Pumping	2	do	18	do	1	Do.
Gas lift		do		do	3	Do.
Number of gas wells.		do	4	do	5	Do.
Average gas-oil ratio.	1,416	Nov. 1, 1939	2,470	Nov. 9, 1939	3,433	Nov. 1, 1939
Average gas-fluid ratio.		do	2,460	do	3,124	Do.
Daily oil production.	64	do	1,718	do	4,180	Do.
Daily gas production.	90M	do	4,243M	do	14,350M	Do.
Daily water production.		do	30	do	326	Do.
Type of gas	Sour	do	Sweet	do	Sour	Do.
Number of remedial work jobs.				do	5	Do.
Total oil, 1939	25,687		520,979		1,301,810	
Total gas, 1939	36,372M		1,286,818M		4,469,114M	

Field summary—Continued

Field producing horizon	South Lovington limestone	Date	Vacuum limestone	Date	West Eunice limestone	Date
Age	1		3 years		2 years	
Number producing acres.	1,200	Jan. 1, 1940	10,560	Jan. 1, 1940	200	Jan. 1, 1940
Number oil wells	30	do	264	do	5	Do.
Flowing	28	do	237	do		Do.
Pumping	2	do	21	do	5	Do.
Gas-lift		do	6	do		Do.
Number gas wells	2	do		do		No.
Average gas-oil ratio	733	Nov. 1, 1939	840	Nov. 1, 1939		Nov. 1, 1939
Average gas-fluid ratio.		do	840	do		Do.
Daily oil production.	917	do	11,877	do	208	Do.
Daily gas production.	672M	do	9,976M	do		Do.
Daily water production.		do	45	do	30	Do.
Type of gas	Sour	do	Sour	do	Sour	Do.
Number of remedial work jobs.		do	5	do		Do.
Total oil, 1939	178,997	do	2,867,802			36,249.
Total gas, 1939	131,205M		2,408,954M			None.

Summary of Lea County fields

	Daily barrels of oil	Daily barrels of water	Daily gas (M)	Gas-oil ratio
Cooper	3, 925	63, 630	53, 929	13, 740
Corbin	40			
Eaves	860	3, 007	2, 874	3, 342
Eunice	22, 764	9, 480	128, 684	5, 653
Halfway	80			
Hardy	3, 260	43	8, 557	2, 625
Hobbs	13, 120	12, 500	24, 691	1, 882
Jal	503	13, 452	2, 783	5, 533
Langlie	5, 750	5, 323	21, 562	3, 750
Lynch and North Lynch	609	3, 407		
Lynn	956	980	1, 946	2, 036
Mattix	4, 938	92	16, 808	3, 404
Monument	23, 299	1, 320	76, 677	3, 291
Penrose	4, 727	43	22, 434	4, 746
Rhodes	95	4		200
Skaggs	64		90	1, 416
Skelly	1, 718	30	4, 243	2, 470
South Eunice	3, 433	326	14, 350	3, 433
South Lovington	917		672	733
Vacuum	11, 877	45	9, 976	840
West Eunice	208	30		


HOBBS POOL GAS-OIL RATIOS
AND DAILY OIL PRODUCTION
Illustrating the changes in gas-oil ratios with respect to daily oil prod. and age of pool.
It also shows the impractibility of establishing a fixed gas-oil ratio covering the life of this or any other pool
- - - g-o ratio
___ oil prod.
DAILY OIL PROD.
40000
30000
20000
10000
AVE. GAS-OIL RATIOS
2500
2000
1500
1000
1930
1931
1932
1933
1934
1935
1936
1937
1938
1939

Wells in Lea County with gas-oil ratios in excess of 5,000

MAY 1938

Field	Federal land	State and fee land
Cooper	3	21
Eunice	12	65
Hardy		9
South Eunice	2	10
Langlie	1	5
Lynn		2
Mattix	2	2
Penrose	7	6
Skelly		8
Hobbs		32
Jal	5	5
Eaves	1	1
Rhodes	2	
Monument	8	64
Total	43	230
Percent of total wells with ratios in excess of 5,000	15.75	84.25
Grand total, 273.		

JULY 1939

Field	Federal land	State and fee land
Cooper	1	18
Eunice	18	92
Hardy		12
Langlie	3	6
Lynn		4
Mattix	3	5
Penrose	9	29
Skaggs	1	
Skelly		4
South Eunice	1	16
Hobbs		17
Jal	7	5
Rhodes	3	
Monument	10	60
Total	56	268
Percent of total wells with ratios in excess of 5,000	17.28	82.72
Grand total, 324.		

JAN. 1, 1940

Federal land	72
Fee and State land	270
Total wells in State	3,037

Wells on Federal land with ratios in excess of 5,000, 2.37 percent.
Wells on State and fee land with ratios in excess of 5,000, 8.89 percent.

New Mexico production by fields by months, 1939

Field	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Total
Aztec	146	145	------	210	135	90	176	141	66	------	76	------	(1, 185)
Artesia	14, 992	12, 478	15, 761	13, 425	14, 973	14, 258	13, 923	8, 416	15, 743	14, 072	14, 264	------	(152, 305)
Barber	1, 349	------	------	1, 623	------	------	------	------	2, 380	4, 563	2, 881	------	(12, 796)
Cooper	118, 743	115, 424	133, 236	126, 720	132, 113	121, 226	124, 800	72, 062	99, 801	121, 692	110, 431	103, 353	1, 379, 601
Corbin	------	------	------	------	------	------	------	------	------	------	------	1, 369	1, 369
Eaves	24, 988	21, 905	27, 293	24, 598	28, 391	26, 603	27, 807	17, 159	23, 056	26, 655	23, 231	23, 901	295, 587
Eunice	650, 479	625, 930	748, 588	706, 945	747, 597	713, 289	727, 165	361, 513	590, 500	705, 682	654, 022	660, 061	7, 391, 771
Getty	3, 567	1, 909	2, 271	1, 593	434	1, 597	------	------	------	------	------	------	(11, 371)
Grayburg-Jackson	157, 106	120, 367	157, 537	144, 680	147, 732	143, 569	147, 774	72, 216	163, 514	192, 892	141, 679	------	(1, 589, 066)
Hardy	80, 361	74, 427	86, 255	84, 973	89, 270	89, 704	95, 909	47, 021	94, 670	101, 057	97, 913	104, 254	1, 045, 814
Hobbs	411, 724	363, 835	426, 827	391, 623	416, 319	396, 890	428. 060	187, 447	309, 114	406, 734	344, 531	366, 704	4, 449, 808
Hogback	6, 094	5, 475	6, 194	5, 889	6, 352	5, 940	6, 027	4, 559	5, 880	5, 155	6, 345	------	(63, 910)
Jal	21, 180	21, 837	19, 567	18, 213	17, 287	17, 167	15, 481	9, 839	15, 714	15, 582	17, 014	18, 074	206, 955
Langlie	130, 453	128, 212	151, 190	153, 348	167, 052	159, 538	175, 725	69, 851	129, 726	178, 252	163, 531	156, 328	1, 763, 206
Leonard	12, 697	9, 234	11, 067	9, 926	10, 015	9, 582	17, 134	8, 651	16, 877	20, 307	20, 996	------	(146, 486)
Loco Hills	1, 882	1, 517	3, 843	5, 306	4, 997	8, 626	8, 866	8, 659	32, 805	65, 770	81, 534	------	(223, 805)
Lynch	15, 129	14, 018	16, 932	16, 084	16, 921	16, 114	15, 863	7, 549	16, 533	17, 944	14, 576	14, 347	182, 010
Lynn	22, 945	20, 622	23, 350	22, 125	22, 928	21, 566	21, 699	9, 402	27, 452	29, 627	24, 884	24, 993	271, 593
Maljamar	22, 998	19, 639	29, 953	25, 053	27, 129	17, 815	41, 230	18, 470	45, 196	41, 834	40, 065	------	(329, 382)
Mattix	96, 499	94, 689	111, 650	115, 981	121, 670	129, 462	140, 785	68, 893	123, 506	163, 091	155, 464	159, 202	1, 480, 892
McMillan	147	147	------	------	------	------	------	------	------	------	------	------	(294)
Monument	726, 054	647, 747	749, 146	722, 862	768, 206	749, 570	268, 797	389, 513	642, 914	722, 269	683, 754	668, 673	7, 739, 445
North Lynch	1, 157	1, 127	1, 193	1, 199	1, 235	1, 086	1, 021	174	1, 092	934	902	932	12, 052
North Maljamar	------	------	------	------	------	------	------	------	358	158	146	------	(662)
Penrose	152, 286	134, 347	150, 723	138, 645	140, 253	139, 128	141, 248	64, 188	134, 629	146, 540	134, 380	143, 506	1, 619, 873
Rattlesnake	19, 819	9, 858	18, 012	18, 598	17, 073	15, 192	22, 983	17, 483	17, 706	16, 933	20, 392	------	(194, 049)
Red Lake	4, 449	3, 685	5, 812	6, 714	7, 582	6, 122	5, 905	6, 286	11, 733	10, 184	9, 331	------	(77, 803)
Rhodes	3, 675	2, 662	3, 953	2, 630	3, 671	3, 262	2, 814	1, 214	3, 122	2, 934	2, 811	2, 411	35, 159
Robinson	11, 971	9, 709	11, 706	10, 232	9, 732	9, 597	8, 896	5, 905	9, 397	8, 212	8, 316	------	(103, 673)
Shugart	4, 546	5, 830	6, 627	6, 721	7, 322	3, 495	9, 224	4, 238	10, 647	8, 785	9, 622	------	(76, 057)
Skaggs	550	2, 450	2, 598	2, 016	2, 591	2, 327	2, 464	530	3, 087	1, 984	2, 646	2, 444	25, 687
Skelly	44, 715	39, 103	47, 316	43, 901	44, 523	42, 346	43, 062	22, 483	47, 024	53, 252	47, 135	46, 119	520, 979
South Eunice	92, 615	87, 266	94, 326	99, 938	108, 764	107, 802	123, 217	65, 792	137, 320	129, 591	127, 230	127, 949	1, 301, 810
South Lovington	789	4, 143	4, 685	6, 675	6, 673	8, 178	17, 047	9, 516	23, 600	28, 423	33, 098	36, 170	178, 997
Table Mesa	2, 949	1, 923	2, 404	2, 664	------	2, 052	2, 363	584	2, 975	3, 604	742	------	(22, 260)
Vacuum	173, 285	123, 501	172, 422	180, 376	183, 993	170, 075	185, 407	105, 553	219, 341	368, 181	480, 237	505, 431	2, 867, 802
West Eunice	3, 183	2, 420	2, 882	3, 010	3, 010	1, 807	2, 897	------	------	6, 456	5, 182	5, 402	36, 249
Total	3, 034, 244	2, 727, 517	3, 245, 319	3, 111, 655	3, 274, 435	3, 155, 075	2, 845, 769	1, 665, 307	2, 977, 120	3, 619, 349	3, 479, 361	------	------

Total Lea County runs 1939=33,636,041 barrels, and includes 329,382 barrels from Maljamar Field.

NOTE.—Figures in parentheses for first 11 months of 1939 only.

MAP INDEX

Map No. 1. Regional map of southeastern New Mexico (lime fields in green; sand fields in red).

Map No. 2. Water map of Hobbs, Monument, and Eunice (40-acre units making water, shown in blue).

Maps Nos. 3–11. Remedial work maps (40-acre units having had remedial work; packers, plug back, squeeze cement jobs, etc., shown in red).

(Maps referred to, filed with committee.)

BEFORE THE OIL CONSERVATION COMMISSION OF THE STATE OF NEW MEXICO

(Case No. 19)

In the matter of the hearing called by the Oil Conservation Commission of the State of New Mexico for the purpose of considering the adoption of regulations governing gas-oil ratios in the various producing fields in New Mexico.

ORDER OF THE COMMISSION PRESCRIBING RULES AND REGULATIONS FOR GAS-OIL RATIO SURVEYS IN NEW MEXICO

By the Commission:

This cause came on for hearing at 10 o'clock a. m., on the 9th day of December 1939, in the chamber of the House of Representatives, in the State Capitol, Santa Fe, N. Mex.

Now, on this 13th day of January 1940, the commission having before it for consideration the evidence adduced at the hearing in said case and being fully advised in the premises, the commission adopted the order herein simultaneously with the adoption of Order No. 236 of the commission, setting a time for the purpose of presenting objections to the commission as to Order No. 238 of the commission (regulating and prescribing maximum gas-oil ratios for the various fields of the State of New Mexico) and as to Order No. 237 of the commission (prescribing rules and regulations for gas-oil ratio surveys in New Mexico); Order No. 238 of the commission, regulating and prescribing maximum oil-gas ratios for the various fields of the State of New Mexico.

The rules and regulations set out hereinbelow shall govern gas-oil ratio surveys in New Mexico:

All operating gas-oil ratio tests shall be taken under the supervision of the Oil Conservation Commission of New Mexico.

Duties of the Oil Conservation Commission.—(1) Assemble the information supplied by the operators as recommended in section 3 herein, and arrange test schedule; (2) to assign engineers to supervise tests except that such engineer shall not be in charge of the test on his employers property; (3) to properly instruct all engineers in the proper operation of measuring equipment and procedure in conducting the tests; (4) to calibrate and maintain all metering equipment in first-class condition; (5) to furnish, calculate, record and file all gas measurement charts and records; (6) compute all gas-oil ratios; (7) determine whether the test was properly conducted, and if necessary schedule retests.

Duties of the engineer in charge of tests.—The duties of the engineer are restricted to (1) the supervision of the installation of the gas measuring equipment; (2) the proper operation of the equipment; (3) the proper gaging of the lease tanks to accurately determine the production of oil and water; (4) the proper recording of the pertinent data required; (5) the supervision of the placing of seals or locking devices.

Duties of the operator.—The operator shall: (1) in accordance with existing rules and regulations of the Conservation Commission, each well shall be equipped to conveniently make a gas-oil ratio test; (2) furnish the Oil Conservation Commission a complete list of his wells showing the type of metering equipment best adaptable for accurate gas measurement in accordance with rules contained herein; such information shall include the size of vent line, size of orifice flange or connection available, and if possible, the desirable size of orifice in the orifice plate; (3) furnish sufficient and qualified lease labor to install and manipulate all lease equipment, including the installation and/or changing orifice, raising or lowering vent lines, etc.

Manner of testing.—1. For the purpose of stabilization, each well shall be produced for a period of 24 hours at a rate as nearly as possible to the normal manner of operation but not less than the daily allowable.

2. Lease tanks shall be gauged by the supervisor at the beginning and end of this stabilization period.

3. No change shall be made which affects the rate of production during the last 18 hours of the stabilization period.

4. The test period shall consist of 24 hours. Oil shall be gaged for the full period and gas shall be measured for a period of at least 6 hours.

5. In case of a heading or stop-cocked well the gas shall be measured for the full 24-hour period.

6. If for any reason should gas be withdrawn from the casing, this volume of gas shall be added to that produced through tubing in computing the gas-oil ratio and such gas shall be measured for the full 48 hours of stabilization and test periods, and the largest volume whether the first or second 24 hour period, shall be used in computing the gas-oil ratio.

7. For gas-lift or jetter wells the total volume of gas to be used in computing the operating gas-oil ratio is the total output volume minus the total input volume.

Liquid measurements.—1. All tanks shall be gaged to the nearest ⅛ inch. Care should be exercised to keep the gage line taut and in case there are ripples or foam on the oil surface the tank should be allowed to stand until the fluid reaches equilibrium and the foam can be brushed aside.

2. Tanks shall be thiefed immediately before and after the test and water percentage determined in accordance with the American Petroleum Institute specifications.

3. The total volume of liquid produced shall be calculated in accordance with the latest pipe-line strapping tables of the tanks.

4. The net volume of oil shall be the total volume of fluid less the volume of B. S. and W. as determined by paragraph 2 above.

5. Fluid level must be maintained relatively constant, such that the oil dump valve is covered at all times by at least 12 inches of liquid.

6. If it is necessary to use a flow tank for the separation of water the water-oil level must be the same at the beginning and end of the test and the water removed from the flow tank must be measured or metered.

7. All liquid measurements shall be in barrels of 42 gallons and shall be carried to the second decimal.

Gas measurement.—1. A calibrated pressure gage shall be installed on each separator and readings taken periodically. In the event the operator chooses to conduct the test at abnormally high pressures, a recording pressure gauge will be installed on the separator and the measured gas-oil ratio may be increased by the measured or estimated volume of gas going to the tanks. Estimated volume shall be based on the gas-solubility versus pressure curves for the field or area in which the well is located.

2. For computing the volume of all gas produced the standard of pressure shall be 10 ounces above an atmospheric pressure of 14.4 pounds per square inch, the standard temperature shall be 60° F. and the standard of specific gravity shall be 0.85 as compared to air. All measurements of gas shall be adjusted by computation to these standards. In case the gas measurement is made at an abnormally high pressure the measurement may be adjusted in accordance to deviation from Boyles Law. Gas volumes will be computed in cubic feet and gas-oil ratios in cubic feet per barrel of oil.

3. Only recording type gas measuring devices may be used.

4. Orifice well testers, orifice meters, and side pressure test nipples are approved as measuring devices and the side pressure test nipples are approved only when it is necessary to measure volumes larger than can conveniently be measured by orifice meter.

Any well that cannot be tested under the preceding rules shall be referred to the oil Conservation Commission for special consideration and rules. All wells must be tested.

Done at Santa Fe, N. Mex., this 13th day of January 1940.

New Mexico Oil Conservation Commission,
By Frank Worden,
Commissioner of Public Lands.
By A. Andreas,
State Geologist.

BEFORE THE OIL CONSERVATION COMMISSION OF THE STATE OF NEW MEXICO

(Case No. 19—Order No. 238)

In the matter of the hearing called by the Oil Conservation Commission of the State of New Mexico for the purpose of considering the adoption of regulations governing gas-oil ratios in the various producing fields in New Mexico.

ORDER OF THE COMMISSION REGULATING AND PRESCRIBING MAXIMUM GAS-OIL RATIOS FOR THE VARIOUS FIELDS OF THE STATE OF NEW MEXICO

By the Commission:

This cause came on for hearing at 10 o'clock a. m., on the 9th day of December 1939, in the chamber of the House of Representatives, in the State Capitol, Santa Fe, N. Mex.

Now, on this 13th day of January 1940, the Commission having before it for consideration the evidence adduced at the hearing in said case and being fully advised in the premises, the commission adopted the following regulations governing gas-oil ratios in the various producing fields in New Mexico, as follows:

The system of gas-oil ratio control in the State of New Mexico shall be known as that of volumetric control, which penalizes the unit of production for exceeding the maximum gas volume established for each field by decreasing its monthly allowable in accordance with the formula as provided hereinafter.

The maximum gas-oil ratio assigned to each field in New Mexico is listed below:

Field:	*Ratios*	Field—Continued.	*Ratios*
Cooper	10, 000	Skaggs	1, 000
Eaves	4, 000	Skelly	5, 000
Eunice	7, 000	S. Eunice	5, 000
West Eunice	1, 000	S. Lovington	1, 500
Halfway	1, 000	Vacuum	2, 000
Hardy	5, 000	Artesia	1, 000
Hobbs	3, 500	Grayburg-Jackson	1, 000
Jal	10, 000	Leonard	1, 000
Langlie	5, 000	Loco Hills	1, 000
Lynch	1, 000	Maljamar	1, 000
Lynn	3, 000	N. Maljamar	1, 000
Mattix	5, 000	Red Lakes	1, 000
Monument	5, 000	Robinson	1, 000
N. Lynch	1, 000	Shugart	1, 000
Penrose	7, 000	Barber	1, 000
Rhodes	1, 000	Gotty	1, 000

1. Any oil-producing unit with a net gas-oil ratio in excess of the assigned maximum for the field in which it is situated as listed in the table above shall be allowed to produce daily a total volume of oil which, when multiplied by the gas-oil ratio of the unit will result in a total gas volume that does not exceed the allowance per top allowable unit as fixed in the current monthly proration schedule of the Commission for the field in which the unit is situated times the gas-oil ratio for said field. *Provided*, that nothing herein contained shall have the effect of increasing the oil allowable of any unit above that fixed in the current proration schedule.

2. All units to which gas-oil ratio corrections are applied shall be set up in the proration schedule first and the remaining oil equitably reallocated to the other producing units in the state.

3. A marginal well shall be permitted to produce the same total volume of gas which it would be permitted to produce if it were a nonmarginal well.

4. In the event that gas-oil ratios are not reported for any unit, then that unit will be omitted from the proration schedule.

5. The gas-oil ratio used in calculating penalties for any producing unit shall be those reported immediately prior to the beginning of the proration period on form C–104 A or those measured under the supervision of the Oil Conservation Commission.

Done at Santa Fe, N. Mex., this 13th day of January 1940.

NEW MEXICO OIL CONSERVATION COMMISSION,
By FRANK WORDEN,
Commissioner of Public Lands.
By A. ANDREAS,
State Geologist.

SUPPLEMENTAL STATEMENT OF A. ANDREAS, STATE GEOLOGIST AND MEMBER OF OIL CONSERVATION COMMISSION OF NEW MEXICO, BEFORE THE SUBCOMMITTEE OF THE COMMITTEE ON INTERSTATE AND FOREIGN COMMERCE, HOUSE OF REPRESENTATIVES, HEARING ON H. R. 7372

REPLY TO CHARGES MADE IN EXHIBIT A

Paragraph 2 of exhibit A of the Interior Department entitled "Present and Recent Instances of Avoidable Waste in Oil and Gas Production" as charged by the United States Geological Survey, states that none of the gas produced in Eddy County, N. Mex., is processed for the extraction of natural gasoline and sets forth that an estimated waste of 6,475 gallons of natural gasoline present in the gas is thus lost each day.

The Phillips Petroleum Co. operated a gasoline plant in Eddy County between 1925 and 1931 at which later time it was abandoned because the operation was unprofitable. There are numerous small fields in Eddy County, none of which produce casing head gas of such quality or quantity or of an indicated life to warrant the investment of appreciable sums of money for the extraction of gasoline. Even though plants were built, their operation would be unprofitable as is evidenced in the case of the Phillips Petroleum Co. just cited.

Cooper and Lynn Field.—On page 21 of my prepared statement given before your committee, I discussed the formational characteristics of the Jal, Cooper field and pointed out through remedial work, gas-oil ratios had been reduced on 33 percent of the wells. I also called attention on page 22 to the necessity of producing huge quantities of water in order to prevent total loss of the remaining oil in the reservoir which oil cannot be produced profitably without the use of gas lift methods. Some 63,630 barrels of water is produced per day in washing out and producing the oil from the formation. The United States Geological Survey statement (exhibit A) gives the gas-oil ratios of 11,000 cubic feet per barrel for this area, but no mention is made of the 6,000 cubic feet per barrel of gas which is necessary to use in producing the oil. When this 6,000 cubic feet is subtracted from the 11,000 cubic feet, a net gas-oil ratio of 5,000 cubic feet for these fields is obtained. This input gas is taken from horizon producing gas only. Its energy is utilized in producing oil from these fields, after which it is processed through gasoline plants where the gasoline is extracted. The residue from the gasoline plant is then sold to the El Paso Natural Gas Co. and transported through its lines to be utilized for domestic and commercial purposes in the cities of El Paso, Tex., and numerous cities and towns in New Mexico, Arizona, and Mexico.

After deducting the gas processed in gasoline plants, sold to gas purchasers, and utilized for lease operations, the remaining amount, when divided by the daily oil production, gives a net gas-oil ratio usually well within the limits of the requirements of conservation.

REPLY TO CHARGES MADE IN EXHIBIT B

Present and recent instances of avoidable waste in oil and gas production as charged by the Bureau of Mines

Paragraph 1 states one-half the gas produced in Lea County is blown to the air and wasted.

A survey conducted by the Conservation Department of New Mexico discloses that actually 34½ percent of the gas was not utilized.

Monument and Eunice fields.—Exhibit B states that it is evidence that waste of gas and reservoir energy in the Eunice field can be reduced by repair programs. On page 21 of my statement before your committee, I called attention to the Bureau of Mines report, Investigation No. 3456 on the Reservoir Characteristics of the Eunice Oil Field, New Mexico, dated July 1939, in which the extreme erratic characteristics of this pool were discussed. This report made no mention of gas waste, nor did it make any suggestion as to how reservoir conditions could be improved; neither was remedial work suggested, although the United States Department of the Interior has the sole control of 105 wells or 22 percent of the total number in the pool.

The number of wells on Federal lands with gas-oil ratios in excess of five thousand cubic feet increased 50 percent from May 1938 to July 1939, while those on State and fee lands increased 40 percent over the same period.

Exhibit B further states that the gas-oil ratios in the Monument pool in 1935 were but 1,034 cubic feet per barrel and that in September 1939 it has risen to 3,291 cubic feet per barrel. In 1935, there were 5 wells in the pool and but thirty-three thousand barrels were produced for the entire area, while in September 1939, there were 485 wells in the pool and many wells had been drilled in areas which could be produced only through high gas-oil ratios which wells, if shut in, would leave unrecoverable oil which could not be produced by other wells in the field. Furthermore, experience in the Monument pool is no different than that of other lime pools in that regional area, or other areas, in that gas-oil ratios increase with the age of the pool. The reason for this will be discussed later in this statement.

Cooper.—The reply to exhibit A for this field also covers the charges made in exhibit B.

Eddy County.—The reply to exhibit A for this field also covers the charges made in exhibit B.

REPLY TO CHARGES MADE IN EXHIBIT C

Supplemental statement on natural gas in New Mexico as charged by the Petroleum Conservation Commission

The following tabulation gives the result of an accurate survey made by the Oil Conservation Department of New Mexico covering the production and commercial use of gas in 1939:

Total 1939 gas production and its commercial uses

Total gas production	169, 016, 215, 000
Amount processed by gas plants (52½ percent)	88, 671, 389, 000
Of this amount the following is used for domestic and commercial purposes in El Paso, Carlsbad, Lordsburg, Phoenix, Tucson, Douglas, Hobbs, Lovington, and other towns in New Mexico, Texas, Arizona, and Mexico	45, 625, 000, 000
Amount used by drilling rigs (4.7 percent)	8, 000, 000, 000
Amount used in gas lift and lease maintenance (5.9 percent)	10, 000, 000, 000
Amount used by towns, camps, etc. (2.4 percent)	4, 000, 000, 000
Amount blown to the air (34½ percent)	58, 344, 826, 000

The above table shows that 34½ percent was untreated instead of 59 percent as reported in exhibit C.

The Petroleum Division report further states that 300 million cubic feet per day is wasted while our survey shows 160 million cubic feet per day is not utilized.

There is a further statement in the report to the effect that an operator with a high gas-oil ratio can change the classification of his well from that of an oil well to a gas well and thereby avoid any regulatory limitations on either his gas or oil production.

Such a thing has never been done in the State of New Mexico.

The present gas-oil ratio withdrawal regulations specifically set out a definition for a gas well, as a well with a gas-oil ratio of over one hundred thousand cubic feet per barrel of oil from which all gas is sold for domestic and commercial consumption excluding gas sold to gasoline plants or carbon black plants.

The foregoing statements answer the charges made by the agents of the Interior Department against the administration of conservation in my State.

Because all the charges in exhibits A, B, and C, were based on avoidable waste, I would like to add to this supplemental statement a discussion of the various kinds of waste I have encountered in the many years I have been connected with the administration of oil conservation in the State of New Mexico.

After reading the report of the Natural Resources Committee and after reviewing the testimony of some of the Department of Interior representatives, it appears to me that there is a wide variety of opinions as to what constitutes the various forms of waste such as economic, physical and avoidable waste.

The conservation statute of New Mexico defines waste in what I would class as reasonable, workable terms. The definition of waste contained in the conservation bill you have under consideration, in my opinion, treats waste in a theoretical-academical way, which if applied, as a law to the production of oil and gas would result in conditions which would put the price of gasoline beyond the reach of the average consumer. The proposed conservation bill demands that no oil be produced except at 100 percent efficiency of all reservoir energy forces and that all reservoirs be produced at the same relative rate of daily production to reserves. Both demands are physically impossible to meet if the production of oil be kept upon a profitable basis. Oil must be produced on a profitable basis or it cannot be produced at all through the operation of free enterprise. If oil be so produced that it is profitable, in every case the requirements of this conservation bill would, in some measure, be violated.

With this bill a law, the industries would be faced with this picture:

On one hand, the Secretary of Interior, with unlimited authority to determine in fractions of the law and to fix penalties; and on the other, oil producers who would be forced to violate the law if they produced their oil profitably. The operator then would be at the mercy of the administrators of the law eac hday he produced his wells.

The conservation statutes in most States do not prohibit economic waste, as such. However, the Department of the Interior has charged economic waste against the industries and the conservation bodies.

Mr. McLaughlin, in his appearance before you, pointed out that economic waste in the east Texas field through the drilling of 23,000 unnecessary wells and 7,000 more which he says will be drilled, necessitating the unnecessary expenditure of 1 billion dollars and that if the same degree of waste had occurred in the oil industries as a whole during the past decade, the unnecessary expenditure would have been six and one-half billion dollars (p. 503).

I do not believe that Mr. McLaughlin's charges of unnecessary wells can be directed toward the State of New Mexico, but even though the industry may have spent billions of dollars injudiciously and imprudently in the past decade, it is a fact undisputed that the product it has offered the public has declined in price and increased in quality and these billions of dollars have multiplied many times over in passing from the worker to the merchant, to the manufacturer and all the intermediaries. Had they not been spent, the wheels of industry would have turned more slowly, the depression would have been more depressing, and the mounting red line of the public debt thermometer would have long ago passed the danger mark. We are of the opinion that an industry which can spend injudiciously to the benefit of the worker, the farmer, the merchant, the lawyer, the doctor and all the other members of our complex social organization in directly affected and give the consuming public, at the same time, a better product for less money, should not be rebuked or threatened with Federal control, for making this world a better place in which to live. Even should gasoline be made infinitely cheaper, if the consumer could not earn the money wherewith to buy it, our economy would be false.

The charges of the Interior Department against the States and the oil industry, filed with your committee on February 8 had to do with avoidable waste. In my opinion all waste is avoidable. But, to avoid it entirely would require the absolute shut-in of a field. Avoidable waste begins as soon as any field is put on production, the degree of such waste having a definite relationship to the extent with which allowable production approaches wide open flow. I am told it has been found impossible to produce even the East Texas Field at exact gas-in-solution rates. Engineers call the gas that is dissolved in the oil in its original state under pressure in the reservoir the "gas-in-solution". This gas is liberated usually as soon as pressure drops even a small amount, although there are one or two fields where a considerable drop is necessary before appreciable quantities of gas come out of solution. The liberation of this gas from its solution in the oil has a direct analogy to the carbon-dioxide dissolved in a bottle of soda water; in both cases, a release of pressure causes the release of gas. When wells in the reservoir are tubed, with the bottom of the tubing well down toward the base of the oil sand, the gas which comes out of solution all over the oil sand is entrapped within the reservoir above the lower opening of the tubing. When proration is practiced, the output of the well is held to a small percent of its maximum ability to produce. When the field is new, the oil is produced with very little more than its gas-in-solution, but as time goes on, the ratio increases as gas already released from the reservoir oil finds it way to the tubing in advance of the oil from which it originally was released. It has been found impossible to control it otherwise, even in those fields where unitization has been applied and production highly restricted.

It has been brought out in testimony before you heretofore, that each well is a problem within itself, and that no arbitrary gas oil ratio rule can be made to change the laws of nature. Nature prohibits two things definitely: First, a barrel of oil cannot be taken from the reservoir without producing along with that barrel of oil the gas which is contained in solution within it, as it reaches the well tubing. It is as impossible to bring to the surface a barrel of oil without its gas-in-solution, as it is to pour the soda water out of a bottle and leave all the carbon dioxide gas contained therein behind in the bottle. Secondly, more gas must accompany each barrel of oil produced than has been dissolved within it, in those fields where the reservoir pressure has dropped below that point at which gas begins to come out of solution. The amount of this extra gas, which must accompany each barrel of oil, varies with the pressure in the reservoir, the rate at which the well is produced, and the particular porosity and permeability conditions in the formation around the well.

Apparently, in the charges of the Interior Department given to your committee on February 8, all of the gas produced with each barrel of oil has been classed as avoidable waste. As I said before, it is avoidable only by shutting in the entire field. There is a fixed rate of production for each well which will hold its gas-oil ratios to a minimum. These rates vary from well to well, and may be high enough to encourage the coning of water behind the oil, causing entrapment and waste; whereas, if the oil is produced very slowly, the water keeps its level and no entrapment occurs. Between the danger of water coning on one hand, and high gas-oil ratios on the other, it is up to the Conservation Commissioner to decide the value to be given gas-oil ratios and water drive, so that the least waste will occur. Here again he is confronted with another difficulty. If it seems apparent that the well output should be drastically restricted in order to prevent waste, pay out can be made so long that the development of the field would become unprofitable. This would hold true not only at the present time, but at any future date. The problem then ceases to be academic and approaches one of placing a reasonable interpretation upon property rights. It has been said before that the property rights of the present generation should not be confiscated for the benefit of some future generation. I believe that this is true, because the laws of nature will not change to that point which would allow production at a profit from a particular reservoir without waste in the future, if production from that reservoir at this particular time cannot be had at a profit without waste.

It is charged, in the February 8 exhibits of the Interior Department, that waste is occurring in the Jal and Cooper fields of New Mexico. Both these fields are in the last stages of production, and produce large quantities of water. It has been proven necessary to produce unlimited quantities of water in these fields to flush out the remaining oil in the reservoir. These fields are now being produced in what is, in my opinion, the best manner to prevent waste, whereas under the waste provisions of the conservation bill we are considering, it would be classed as waste and punishable by severe penalties. As it is now, the remaining oil finally producible before abandonment is being recovered by the excessive use of water energy and the expenditure of the remaining gas—reasonable consideration of economics in this case being the fact that the gas is of less value than the value of the remaining oil.

The conservation commissioner is confronted with another difficulty in addition to the foregoing. Gas may be coming out of solution to such an extent that high gas-oil ratios prevail. The value of the gas may be less than the cost to the operator of returning it to the formation. In some cases, the cost of returning to the reservoir may be greater than the combined value of the gas and the additional oil which may be recovered thereby.

To complicate the commissioner's troubles further, a recent theory has been developed that recovery under water drive is more efficient than under gas drive, so that some engineers may argue that this return of the gas to the reservoir might actually cause less oil to be recovered.

None of these theories as to the occurrence of waste have been reduced to a quantitative factual basis by the engineers, and by engineers, I mean both the engineers of the industry and of the Department of the Interior. In fact, in my opinion, some of these theories are no more than supposition.

Notwithstanding all these uncertainties that confront a conservation commissioner, and the Department of the Interior as well, the Department of the Interior has charged the industry with waste of all gas produced from oil wells regardless of gas-oil ratios (see Exhibit "C", p. 12), with both high and low gas-oil ratios included.

Just one more thought in connection with these charges that the Secretary of the Interior thrust upon the industry just after their testimony before you had been given. It has been persistently rumored that orders went out to various representatives of the Interior Department to bring in evidences of waste against the oil industry regardless. I do not know as to what types of orders were issued, but it is certain that the type of waste evidence that was returned in most cases is so trivial that it does not warrant your time nor my time in answering I want to make one reference, however, and that is a photograph of a puddle of oil, possibly a few gallons, not more than 30 cents worth if it were not contaminated with dirt, around a repaired leak in a pipe. These few gallons of contaminated oil are comparable, from a waste standpoint, and in actual value, to the contaminated oil drained from the crank case of your automobile every few hundred miles. Its value, if reclaimed, as I said, might be possibly 30 cents, the cost of reclaiming, because of labor and transportation involved, would be many dollars. The cost to the Government to bring this trivial evidence before your committee is many times the value of the oil. Don't you think the Interior Department is a little hard pressed for evidence when it makes a 30-cent waste charge against a $15,000,000,000 industry? Or is this to be construed by the industry and the conservation bodies as the type of harassment this conservation bill will bring upon them?

The Interior Department has further charged that avoidable waste occurs if the gas is not processed through a gasoline plant. To process gas in gasoline plants costs money. Yet there is ample uninvested funds waiting for an opportunity to process gas, where such is profitable. The usual price of natural gasoline in the tank car, ready for the market, is about 3 cents or less per gallon. To connect up the wells with gathering lines, install compressors and engines for processing, and other machinery and manufacturing equipment for extracting and finishing the product to the market requirements, runs into huge investments which are justified only when the gas is rich, the quantity is great, the field is large, and its indicated life long enough to warrant a reasonable return on the investment. Nature demands that gas must be produced with the oil, yet the Conservation Commissioner cannot force a manufacturer to spend money in an unprofitable investment. Neither do I believe he can force the operator to spend more money on the return of the gas to the formation than the combined worth of such gas and the additional oil which it may be instrumental in producing.

I might attempt to illustrate in a homely sort of way the position of the ordinary oil producer in producing gas which is too far from a market, or not available in such quality and quantity to warrant processing for gasoline or carbon black manufacture. When a farmer sends his steers to the packer, it is said that there is no waste. The carcass is cut into meat, the horns and the hoofs are used in making glue, the tail goes into ox-tail soup, and the hide goes into shoes, gloves, and leather goods, and other waste is made into fertilizer. The farmer, if he wants to eat his meat, buys it back from his grocer, paying transportation both ways and other costs. Now, if that farmer should want to kill his steer and utilize his own meat, he might not be able to market any of the auxiliary products which the packer utilizes, because the cost of transportation to the point of utilization is greater than its value to the manufacturer. The horns, the hide, the tail, the bones, and the fertilizer material, go unutilized, and become waste. Yet the farmer cannot kill the steer without killing the parts he cannot use. I do not believe any government could force a farmer to pay transportation on these raw, unutilized products, to a point of utilization, at a loss to him. Neither do I believe any government can or should attempt to force a smelting company to process all unprofitable ore, whether it be gold, silver, lead, copper, tin, or zinc. The same principle holds whether the natural resource is replaceable as in the first instance, or is irreplaceable, as in the last. I believe in reasonable laws and in their reasonable enforcement. I believe that avoidable waste should be prohibited upon a reasonable basis, and not be forced as a strait jacket on the industry, as defined in this conservation bill. I believe that you of the Cole Committee, had you been faced with these same problems for the many years I have, would arrive at the same viewpoint.

Finally, if this bill be passed and its administrators elect to take arbitrary action and demand that all gas be returned to the reservoir or that gas-oil ratios be limited to an arbitrary figure, the result, based upon the present price for oil, would be the shutting in of the majority of the fields, the ceecessation of all development work and the passing on to the public of a fabulous price for gasoline. Under the laws of supply and demand with a supply cut to less than half of the present, the price of gasoline could not be other than prohibitive. Prohibitive prices for gasoline would mean the demoralization of the automobile and steel industries which are the foundation of our present economy. The demoralization of these industries would mean serious economic and industrial disturbances in all other major industries. No other result could be expected if this bill became a law and was administered to the letter. Conservation under the States has been a process of evolution and improvement. It has so regulated the oil industry and indirectly other industries which depend upon it, so that these industries have led the way out of the depression. With conservation methods being constantly improved and with science making enormous strides under State regulation, now is no time to take a chance in wrecking the leading industries of our economic system.

Mr. Cole. I announced the other day that any extension of remarks or insertions in the record, other than what you included here, I wish you would call to my attention, when you put it in, so I can pass on it at the time. It is perfectly all right for you to correct your testimony, but in revising, we do not want a lot of extensions, unless it is brought to the attention of the committee.

On our list today is Mr. Staley, and then Mr. Armstrong of Oklahoma, and finally Mr. Jackson of Montana.

Mr. Staley, we will hear you now, sir.

STATEMENT OF GLENN STALEY, PRORATION UMPIRE FOR THE STATE OF NEW MEXICO

Mr. Staley. Mr. Chairman and gentlemen, my name is Glenn Staley, proration umpire, for the State of New Mexico.

I have no written statement. Mr. Andreas and Hiram Dow, of New Mexico, have covered practically the whole field.

Your committee asked for some information yesterday regarding the so-called Christie committee. I will be glad to furnish you with the minutes of not only that committee. I do not know why that one was singled out, the so-called Christie committee, but I will furnish you with the minutes of and the recommendations made by Mr. Christie's committee to the Lea County operators and the Lea County operators evidently submitted at the hearings of the Commission in December at their hearings on gas-oil ratios in Santa Fe.

We have a large number of these meetings; a large number of committees, and if your committee would like to have the minutes of all of those meetings, we would be glad to compile them and send them in to you.

One other thing that I would like to bring to your attention is that producing oil in the State of New Mexico by natural means, that is, by the gas-in-solution varies from 3 to 5 cents per barrel. The cost of producing oil, pumped or by any artificial means, averages 26 cents a barrel.

So that the operators, regardless of the conservation of the gas are tremendously interested in maintaining reservoir pressure and the gas-in-solution as long as possible.

The operators in Lea County alone have spent in the neighborhood of three-quarters of a million dollars since 1935 in doing remedial work from the standpoint of setting packers, squeeze jobs, deepening, and various types of remedial work.

I believe that is all I have to offer at this time.

Mr. Cole. Mr. Staley, you are the gentleman referred to yesterday as being a member of the State commission?

Mr. Staley. Yes, sir.

Mr. Cole. That is the State Commission of New Mexico created under the act of 1935, composed of the Governor, the commissioner of public lands, and the State geologist.

Mr. Staley. Yes, sir.

Mr. Cole. Then how do you get into the picture?

Mr. Staley. I am a deputy commissioner in charge of the engineering work and the compiling of the information for the field and the making out of the proration schedules under the commission's orders.

Mr. Cole. In actual practice, are the operations in New Mexico, under the law of 1935, very different from the way they functioned prior to the passage of that legislation?

Mr. Staley. Only to this extent———

Mr. Cole. When you have a committee of producers and operators?

Mr. Staley. To this extent, Mr. Cole.

If I may, I will give you a brief outline of the way the conservation and proration has been handled in New Mexico since 1930.

I was formerly State geologist of the State of New Mexico. In 1930 the law allowed the operators, where the market demand was less than the States ability to produce, the operators were allowed to form an agreement among themselves, which was joined by the land commissioner and approved by the State geologist. It had to have the approval of the State geologist under the law.

This was done when the Hobbs field was discovered in 1929 and went into effect on July 5, 1930.

I was given the job as proration umpire and this condition existed until the establishment of the Oil Conservation Commission under the law of 1935.

The Oil Conservation Commission having no set-up or group of engineers, or information, the Governor of the State, or the chairman of the conservation commission appointed me a deputy at a dollar a year, to carry out the orders of the commission until such time as the commission saw fit to do this work for themselves. That has never been changed. Each Governor who has succeeded the Governor in at that time, has reappointed me as his deputy.

We have about five engineers in our office. The commission have two and our oil and gas inspector, who works with me and under my direction. That is, I receive my orders only from the commission.

Mr. Cole. Then how are you paid?

Mr. Staley. I am paid on a per barrel basis. The whole office, the expenses each month, is divided equally among all operators in Lea County, and paid in proportion to the number of barrels that they marketed for that month.

Mr. Cole. Do the operators pay into the State treasury and then are you paid by the State; or how?

Mr. Staley. No, my salary is paid by the operators themselves.

Mr. Cole. In other words all of your compensation is received directly from the operators.

Mr. Staley. Yes, sir.

Mr. Cole. Does this apply to all of your assistants?

Mr. Staley. All of my assistants, except the oil and gas inspectors and the engineers that are on the pay roll of the commission.

Mr. Cole. That totals about $35,000 a year as the cost to the State?

Mr. Staley. The cost to the State runs about $45,000.

Mr. Cole. $45,000?

Mr. Staley. Yes.

Mr. Cole. How much does it cost the operators to maintain this staff?

Mr. Staley. Well, there is very little difference.

Mr. Cole. About the same?

Mr. Staley. About the same; yes. I do not have those figures.

Mr. COLE. Your office is independent of the Commission set-up, that is the staff that is paid for from money paid in by the operators.

Mr. STALEY. Yes, sir.

Mr. COLE. And you prepare all proration schedules, do you not?

Mr. STALEY. Yes, sir.

Mr. COLE. Are there any tests in the various fields conducted by engineers, geologists, and employees or any other set-up than yours?

Mr. STALEY. These various engineering committees. We have what we call an engineering advisory committee made up of one engineer from each operating company that have engineering organizations.

That committee gathers information and makes recommendations. These recommendations are made to the operators' committee which is composed of one member from each operating company in the territory, in New Mexico.

Mr. COLE. That is the committee that was referred to yesterday?

Mr. STALEY. Yes, sir.

Mr. COLE. You appointed that committee, did you not?

Mr. STALEY. I appoint all of them. There are a number of committees working there now on gas-oil ratios and we have three repressuring or pressure maintenance projects under way now.

Mr. COLE. When was the committee appointed for Lea County to study gas-oil ratios?

Mr. STALEY. Well, it first started operating in 1930.

Mr. COLE. I mean to actually do something.

Mr. STALEY. Well, we have actually done something since 1930.

Mr. COLE. Did you not become more active last fall than at any time prior thereto?

Mr. STALEY. Not necessarily; no.

Mr. COLE. Have you any reports by the committee showing the result of the work since 1930?

Mr. STALEY. Yes, sir.

Mr. COLE. Establishing gas-oil ratios?

Mr. STALEY. Yes, sir.

Mr. COLE. Are those reports here?

Mr. STALEY. No; they are not. They are in the minutes of the engineers' meetings that are published each month. I think that we furnish about six or eight copies to various governmental agencies, and we will be glad to go through those and compile the minutes and also minutes that were not published in that engineers' monthly report.

Mr. COLE. The reason I asked the question whether you had done anything is because I have a statement here released on July 22, 1938, by Mr. Andreas, then acting State geologist, which states "that the majority of the operators have not taken the gas-oil ratio problem seriously in the past. Unless every possible measure is taken to correct the high gas-oil ratios we will be forced to adopt maximum gas-oil ratios for the various fields."

Mr. STALEY. That is true.

Mr. COLE. Do you remember that statement being made, Mr. Andreas?

Mr. ANDREAS. Yes, sir.

Mr. STALEY. Yes, sir.

Mr. COLE. Between 1930 and 1938, the work they had done evidently had not been very effective. I am speaking now of the committees.

Mr. STALEY. I might say that in New Mexico we have some peculiar conditions, reservoir conditions, in the lime pools. We run into geological conditions that do not ordinarily exist in an oil field. One of these is of such nature that we are unable to determine what to do because each individual well is an individual case. We invited the Bureau of Mines under Mr. C. C. Anderson from the Office of the Bureau of Mines, at Amarillo, to come in and make a survey of the Eunice Pool that has been mentioned. That survey has been published. The result of his work has been published. The title of the paper is "Reservoir Characteristics of the Eunice Pool."

In that paper, Mr. Anderson points out that the reservoir is divided into a number of zones, cutting across the structure, rather than following vertical conditions, and therefore wells that you would ordinarily expect to produce with a low gas-oil ratio, it is impossible to produce without producing large volumes of water and gas and oil with it, and the thing is that we are trying to do remedial work in an area of that kind, and it is not something that you can just pick out of the air. We have made studies from the standpoint of well cuttings, drill stem, tests made at the time the wells were drilled; the point at which the casing should be set; and the gas-in-solution.

We have now some scientists in all of the fields taking samples, bottom hole samples, in all of the various fields in New Mexico, to determine the amount of gas dissolved in the oil at reservoir pressure.

We are taking them as soon after the well comes in as possible, in order to get primary reservoir information. By taking the pressure and the amount of gas-in-solution as early in the life of a field as possible and then watching the drop in bottom hole pressure in relation to the amount of oil, gas and water produced, we may be able to determine what the optimum rate of flow should be in order to maintain that gas-in-solution as long as possible, because it means money in the pockets of the operators to do so—the difference of between 5 cents and 26 cents.

Mr. COLE. Mr. Staley, you are an engineer, are you not?

Mr. STALEY. Yes, sir.

Mr. COLE. I am just a layman and not so familiar with the technical side of this problem. It is admittedly confusing to me at times, and hard for me to reconcile a great many statements I have before me as presented by various witnesses.

Suppose we take a concrete case dealing with your State.

You mentioned the Bureau of Mines, and much of the explanation you have just given us as to the characteristics peculiar to New Mexico—some of it is over my head, I am frank to admit—but I know what you mean by it.

I have before me the very latest criticism of your State, which presents recent instances of avoidable waste in oil and gas production. Have you seen that, as presented yesterday by the Bureau of Mines?

Mr. STALEY. I just glanced over it.

Mr. COLE. It is not very long. Suppose I read it and then you may stop me any place you please, and inject any comment you want to make.

It reads:

> Most of the present waste in New Mexico results from high gas-oil ratios and waste of gas in the fields of Lea County, which now produce nearly 90 percent of the State's output of oil—

I think I said 92 percent yesterday—

> but there is some waste in Eddy County.

Now, taking Lea County specifically.

> In September 1939, the 20 fields of Lea County were producing about 88,000 barrels of oil and 340,000,000 cubic feet of gas per day from 2,344 oil wells. Only about half of the gas produced is processed for removal of gasoline, and although authoritative data concerning the quantities of gas blown to the air and burned in flares are not available, a conservative estimate indicates that at least 200,000,000 cubic feet per day is wasted in this manner. Thus the gas production from these oil wells is nearly 4,000 cubic feet per barrel of oil produced and the gas wasted is more than 2,200 cubic feet for each barrel of oil.

That is the end of the paragraph. Do you have anything to say about that? I am asking you, because you seem to run the "works" down there.

Mr. STALEY. There are a number of things there that are not explained.

Now, they have not taken into consideration the amount of gas that is in solution. That is they do not give you any credit for that. They count that as waste.

Mr. COLE. Then it goes on:

> In September 1939, 9 of the 20 fields of Lea County had average gas-oil ratios of more than 3,000 cubic feet of gas per barrel of oil and three of these had average ratios of more than 5,000 cubic feet per barrel. These 9 fields with their gas-oil ratios were as follows:

Field	Gas-oil ratio cubic feet per barrel	Field	Gas-oil ratio cubic feet per barrel
Cooper	12, 448	South Eunice	3, 908
Jal	7, 001	Langley	3, 723
Eunice	5, 653	Mattix	3, 386
Penrose	4, 876	Monument	3. 291
Eaves	4, 058		

> Also in September 1939, 315 wells in 13 of the fields had gas-oil ratios exceeding 5,000 cubic feet per barrel. The records show that remedial measures have been undertaken in 340 wells, but these have not been uniformly successful, and in some wells gas-oil ratios have been higher following repairs than before they were undertaken. Undoubtedly gas-oil ratios can be reduced and reservoir energy conserved by further remedial work. Also in many wells repairs to reduce water production have given only temporary relief.

Now, that is about all that the Bureau of Mines has to say about it. And then we have the Geological Survey's report which is entitled:

PRESENT AND RECENT INSTANCES OF AVOIDABLE WASTE IN OIL AND GAS PRODUCTION, NEW MEXICO

> The estimated volume of gas blown to the air, either before or after the extraction of natural gasoline, is shown on figure 1 for the field in which such waste occurs.
>
> As to the estimated natural gasoline content of the gas wasted, no quantitating tests of gasoline content are available for gas produced in Eddy County, but may be estimated to be about 1 gallon per thousand feet of gas. None of the gas produced from wells in Eddy County is processed for gasoline extraction. The estimated volume of gas blown to the air without extraction of gasoline in Eddy County is 6,475,000 cubic feet per day. Therefore, 6,475 gallons of natural gasoline per day which might be saved is lost forever.

I might suggest that if either you or any of the other gentlemen want to add anything to your comments on these statements it is perfectly all right to do so.

Mr. STALEY. I was waiting until you had finished reading.

Mr. COLE. I mean by that, especially Mr. Andreas, if he wants to assist you in answering at this point it is all right.

Mr. STALEY. Thank you. I was just waiting.

Mr. COLE (continuing).

> In Lea County, the volume of gas blown to the air without extraction of natural or casing head gasoline is approximately equal to the quantity of gas processed by natural gasoline and subsequently blown to the air. The estimated gas wastage of each is 97,000,000 cubic feet, or a total gas waste in Lea County of approximately 194,000,000 cubic feet of gas per day.
>
> The gasoline content of gas produced from wells in Lea County fields varies greatly as shown by the average extraction plant recoveries in 1938 in the following representative fields.

The next title is "Waste and Dissipation of Reservoir Energy. Cooper-Lynn."

Now, without reading any more—you have read it over and are familiar with it—what do you have to say about these reports?

Mr. STALEY. Mr. Cole, in the Jal field that was originally drilled in as a gas field. There was no oil. The porosity in the field itself is in the nature of a monocline, the gas occupying the top, a thin band of oil lower on the structure, and then water.

The original wells were drilled on the top structure and at that time a gas line was constructed from the Jal pool to El Paso, Tex.; from there to Tuscon, Ariz., to Phoenix, and on down into Old Mexico. I think there is also a branch line which goes to Douglas, Ariz.

This line where it crosses the Pecos River was tapped and a number of towns on the Pecos River running north are supplied from this gas line.

As the field became older—the field at the present time is about 14 years old—the oil began to show up in the wells. The gas-oil ratios as indicated there is the amount of gas that goes to this gas line and the oil produced is a byproduct of a gas well.

That is true in most of the Jal and some of the Eaves and Cooper pools.

The towns of Jal, Eunice, Monument, Hobbs, Lovington are all supplied from these fields.

When oil was first discovered in the Hobbs pool, the engineers for the companies—there was no regulatory body in the State of New Mexico at that time except the State geologist—the engineers for these various companies, together with the Federal Government, sat down and worked out from drill stem test and the insoluble chemical residue test made of well cuttings where the casing should be set in oil wells in the Hobbs pool.

It was also found that in over a large majority of the Hobbs pool, the pays were seen at or in innumerable streaks, which definitely separated the upper and lower pays. The water encroachment was in the upper pay. Due to the lack of permeability in the lower pay, in the over structure, the water did not encroach as far upon the upper pay as in the lower pay.

It was also found very soon after the first well was drilled that the gas cap was forming in the upper pay. So, packers were set on this impenetrable structure between the two pays and the gas conserved

And the field produced with a very low gas-oil ratio.

In Mr. Andreas' report you will find a graph showing since 1930 the relationship of withdrawals to the drop in bottom hole pressure.

Mr. Cole. Which map is that? Will you point it out here?

Mr. Staley. This one.

Mr. Cole. Go ahead and tell us about it.

Mr. Staley. The solid line [indicating on plat] indicates the oil production and the barrels per day. The broken line——

Mr. Cole. How can we identify this page?

Mr. Staley. Well, it is an illustration showing the changes in the gas-oil ratios with respect to daily oil production in the Hobbs pool.

The broken line shows the variations in the gas-oil ratio and the relation to production.

You will note that as the field grows older the gas-oil ratio goes up and as production goes down—the field at the present time is producing about 10,000 barrels per day, which is its proportionate share of the market outlet for the State.

The field is capable of producing a good many times that amount, or more than that.

This field has produced with a drop in bottom-hole pressure of approximately 3.8 pounds per million barrels of oil; but this condition does not exist in any of the other producing fields in the State where we were able to take a uniform—that is, make out a uniform corrective program and apply it to practically all wells.

Mr. Cole. Do you think it is a proper function of the Bureau of Mines and the Geological Survey to label the conditions described in these exhibits as instances of avoidable waste now being committed in New Mexico?

Mr. Staley. Oil cannot be produced without producing gas. The Bureau of Mines and the United States Geological Survey there in those reports have stated gross gas. They do not allow anything for local conditions either in the field or for the gas lines.

I would hesitate to make any statement regarding those figures without going into the matter from that standpoint.

Mr. Cole. I gather you concede that there is waste, but you are not prepared to admit that it is as extensive as these two agencies have stated.

Mr. Staley. Where we do not have a market for the gas, there is waste. There is bound to be waste. There is waste in every oil field that was ever discovered; but unfortunately where we have this gas, and we do not have any market for it, we cannot plow it under. It is there.

And, in New Mexico; that is, in southeastern New Mexico, it is a sour gas. It is impregnated with hydrogen sulfide. It costs from 5 to 6 cents per thousand feet, which is the amount that the Federal Government gets for its gas, so it doubles the price that they have to pay for the gas, in order to use it at all.

In fact, it is dangerous to use it without treatment. We have lost quite a number of men working in the fields, people who have tapped raw gas lines to furnish a camp house or something and lost their lives through the fumes.

Mr. Cole. You do not have any law in New Mexico prohibiting natural gas produced from gas wells escaping in the air either before or after the gas is processed for gasoline content, have you?

Mr. Staley. I did not get that, Mr. Cole.

Mr. Cole. Will you read the question, Mr. Reporter?

(Thereupon the reporter read the pending question.)

Mr. Staley. No gas is produced from strictly gas wells for gasoline plants alone. Gas from a gas well either goes to aline for domestic or industrial purposes or it is shut in. They do take the gasoline out of this gas and the sulphur out of it before it is put into the line for domestic use, but I know of no instance where gas from a strictly gas well is vented to the air.

Mr. Cole. Is the output of the gas wells in New Mexico regulated at all?

Mr. Staley. I do not think so. I do not think there is any law for ratable taking of gas. That is what you mean?

Mr. Cole. It is.

Mr. Staley. Is there, Mr. Andreas?

Mr. Andreas. Mr. Chairman, the gas wells are only allowed to produce 25 percent of their volume, total volume.

Mr. Cole. Is that a regulation with which you are not familiar?

Mr. Staley. I knew that, but I thought you meant ratable taking of gas.

Mr. Cole. That is what I do mean. You do not have any ratable taking law.

Mr. Staley. We do not have any ratable taking law.

Mr. Andreas. We have no ratable taking law.

Colonel Thompson. The courts would knock it out if they had one, Mr. Chairman, in New Mexico, as they did in Texas.

Mr. Cole. They did in Texas?

Colonel Thompson. They did; yes, sir; in the *Consolidated Gas case*, the *Consolidated Gas Company* v. *Thompson*. The United States Supreme Court upheld them and knocked it out; said you cannot make anybody buy that which he does not want.

Mr. Cole. I think I asked yesterday, Mr. Staley; I asked Mr. Andreas if he had seen a copy of the article entitled "Pressure Maintenance" which appeared in the engineering report, Lea County operators' committee, dated February 8, 1939.

Mr. Staley. I have a note of that and I will supply you with a copy.

Mr. Cole. I am only interested in four or five paragraphs, but because of that, you can put the whole thing in if you think the rest of it will help us.

Mr. Staley. Mr. Cole, we have a number of engineering reports covering the same subject. If you would care to have them we will be glad to send them all to you.

Mr. Cole. Are you a member of the compact group also? Do you sit in the compact meetings representing your State?

Mr. Staley. No, sir.

Mr. Cole. I think that is all, Mr. Staley. Thank you.

Mr. Staley. Thank you.

Mr. Cole. I must leave to attend the transportation conference. I imagine that by the time Mr. Jackson finishes his statement it will be time to recess and then at 2 o'clock this afternoon we will hear Judge Fouts. We can then go on with the compact group on Tuesday morning.

Colonel Thompson. That is entirely agreeable, Mr. Chairman.

Mr. Chairman, if it would suit the convenience of the committee any better, we would be willing to come on the 19th and appear either at the beginning or at the close of the industry's presentation.

Mr. Cole. I think we better hear you Tuesday, Colonel.

Colonel Thompson. Whatever the committee desires.

Mr. Cole. The line-up for the week of the 19th looks like it will be a pretty full week.

Colonel Thompson. We can come at any time.

The only thing is that it would give me a chance to hear the Humble case argued. That is all I am pleading for. That comes on Monday. It is in the Federal court. I am under subpena, someone reminds me. I can fly down and would have to fly back that night. We might have stormy weather or bad flying conditions and I might not get through in time Monday. I would have to tell the court that I had to be two places for the United States Government at the same time, there and here.

Mr. Cole. How would Wednesday suit you?

Colonel Thompson. That is all right, sir.

Mr. Cole. Would that rush you too much?

Colonel Thompson. It would rush me.

Mr. Cole. Would it rush you too much?

Colonel Thompson. It would rush me, but I am at your pleasure.

Mr. Cole. Well, we will do this, with the understanding that the Compact group will take just the morning of the 19th.

Colonel Thompson. Yes, sir.

Mr. Cole. If you want to come that week, I can appreciate, of course, that you would like to be here and hear the industry's case.

Colonel Thompson. That is right, sir.

Mr. Cole. And from what they have handed me as to their testimony for that week, it will be very interesting.

Colonel Thompson. These hearings are very informative. The literature of the trade is being enriched greatly by it.

Mr. Cole. Well, something new is coming in every minute.

Colonel Thompson. I am almost afraid to miss any of it, Mr. Chairman. If you will let us come the morning of the 19th that would be very much appreciated and we will finish by 12.

Mr. Cole. How would it be for you to come Monday morning, and this afternoon for us to hear Judge Fouts. We will not be able to hear anyone but the compact group on that date.

Colonel Thompson. That will not be my fault, Mr. Chairman. I am willing to quit in 30 minutes.

Mr. Cole. Yes, but you open up so easily, Colonel, after you are once on the stand, the Committee always wants to take a little time questioning you. [Laughter.]

Judge Fouts, would you want to be heard today?

Mr. Fouts. Yes, sir, Mr. Chairman.

Colonel Thompson. Yes, sir, Mr. Chairman.

Mr. Fouts. I am glad to be heard at any time.

Mr. Cole. I am afraid toat if we go over to the 19th with the assurances that I have given the industry we might not have an opportunity to hear you.

Mr. Fouts. Mr. Chairman, I am somewhat embarrassed by several requests that have been made to be heard, which have not come from me. I wrote the committee that I would file a paper, and would be glad to appear if the committee thought it advisable, and after writing that I was asked by a number of these regulatory body people if they could use me and I said I would be happy to appear, and I will be glad to appear this afternoon.

STATEMENT OF ANDREW F. SCHOEPPEL, CHAIRMAN, KANSAS CORPORATION COMMISSION

Mr. KELLY. Mr. Schoeppel, you may proceed.

Mr. SCHOEPPEL. Mr. Chairman: I want to say at the outset that very unfortunately Mr. Morgan, our present Conservation Director in Kansas, who has served Kansas in that capacity for a number of years, was taken ill and is at the present time in a hospital. We had expected him to be here, but due to illness, he cannot be and I regret that very much. Another very unfortunate circumstance has also occurred. Joe Haely, who was connected with our Commission and who was known to many members of the State regulatory bodies and petroleum engineers, dropped dead from heart failure a few days ago and is today, I believe, being buried in the State of New York. We will be deprived of his knowledge and experience in these matters.

Probably I will not be in a position to answer a great many of the technical questions because of my limited experience in the technical aspects of this field, but I want to assure the committee that to whatever extent I can answer any questions, I will be glad to do so.

Naturally, on behalf of the State of Kansas and its Corporation Commission, I wish to express our appreciation for the opportunity of appearing before this committee and explaining to you the development of the petroleum industry in our State; the methods and policies we have adopted to regulate this industry; and the results we have accomplished in conservation.

Crude oil has been produced in Kansas for more than fifty years. Development first occurred in the southeastern portion of the State. Many thousand wells were drilled in that area. There are, at the present time, about 15,000 of these still producing oil. They are termed stripper or marginal wells and produce from one-half to five barrels of oil daily.

In 1915 the El Dorado and Augusta pools, located in the central part of the State, were discovered. Both proved very prolific. They produce on an average of 8,000 barrels of oil daily, and are expected to be commercially productive for many more years.

In 1923 oil was found in Russell County about 150 miles northwest of the then nearest production, which was at that time actually known. This discovery opened the western part of the state to leasing, exploration and development. The area is now spotted with many new oil pools. The greater portion of the remaining land is held by leases upon which delay rentals are paid.

Since oil is an irreplaceable natural resource, it should be produced without waste. Physical waste may occur within the reservoir or above ground. Production in excess of economic needs or market demand is waste—and that is a provision of our statute. To avoid waste and obtain the maximum ultimate recovery, an oil well must be so managed and restricted in its rate of production that the reservoir energy, whether water or gas, is conserved.

Before the advent of proration in Kansas, oil production was governed by the rule of capture. Each individual pool was the natural unit of production, but owing to subdivided surface ownership, pools were produced by leases. Producers could withdraw as much oil as they could capture, and their neighbors could do likewise. This system accelerated production. Wells were produced at capacity so that a maximum amount of oil could be captured in the shortest length of time. No thought was given to regulating production to market demand or to the prevention of avoidable waste. Reservoir energy was consequently dissipated.

As a result, unrestricted production and producing wells at full capacity, only about 20 percent of the oil was recovered. The remaining 80 percent was left under ground because the reservoir energy had been exhausted. This method of operation produced more oil than could possibly be sold. Much of it had to be stored in earthen ponds. When new pools were discovered, they were developed too rapidly. The greater portion of the pool's production was therefore forced on the market during a very brief period. Ghost towns flourished and died, streams were polluted and many acres of valuable land were destroyed by oil and salt water.

The rule of capture was a rule of convenience. It was not based on conservation principles. Many operators believed that in order to obtain the greatest ultimate recovery from a well, production had to be at capacity. It was not until the enactment of conservation laws that the folly of this theory was discovered. The rule of capture has been superseded by the enactment of our conservation law. We now know that by restricting the rate of flow, physical waste can be prevented; that a proper utilization of the reservoir energy produces the greatest utlimate recovery. As these facts became established Kansas, like other oil-producing States, kept pace by the enactment of proper legislation.

The period from 1925 to 1929 was a period of expansion. Great oil reserves were discovered in various parts of the nation. The available supply of crude oil far exceeded the demand. The price of crude oil fell below reasonable production costs. Abandonment and ruin faced the oil industry of Kansas. Voluntary proration was tried in a few pools. In a few instances, purchasers of crude oil began to prorate their purchases along their pipeline systems.

And may I interpose there, showing a desire upon the part of that industry iteslf to eliminate some of the evil effects that the conservation laws of my State promulgated and tested, have become a reality among the compacting States.

In 1932 Kansas enacted its first conservation law. Production of crude oil in such manner as to constitute waste was prohibited. The law also provided for ratable taking between wells within a pool. The duty of administering it was delegated to the Public Service Commission, predecessor to the State Corporation Commission, of which I am a member.

In 1933 the Oil Conservation Act of 1932 was amended. "Economic waste" was included in the definition of waste. Waste incident to the production of crude oil or petroleum in excess of transportation or marketing facilities or reasonable market demand was prohibited. This amendment was prompted by the decision of the United States Supreme Court in the case of *Champlin Refining Company* v. *Oklahoma*

Corporation Commission, which incidentally is a landmark in favor of proration.

In 1939 our law was again amended by the enactment of chapter 227, Laws of 1939. The principal amendment consisted of a provision authorizing the Commission to allocate production between pools to satisfy the reasonable market demand for crude oil and to so regulate production as to promote that general welfare of the industry and of my State.

The thesis of oil conservation centers around the rate at which oil is produced. If you control the rate properly, conservation becomes an accomplished fact. Since a large part of the recoverable oil is left behind under unrestricted operations, wells must be restricted below capacity if waste is to be avoided. An available capacity to produce in excess of economic needs must be developed by the industry before restrictions to prevent physical waste would permit sufficient production to satisfy the demand. From these facts, it can be seen that a presently productible surplus must be developed as a necessary prerequisite of conservation. However, once such a surplus has been developed, it is indistinguishable from overproduction and has a depressing economic effect upon the industry. According to the results of tests conducted by us, the wells in the State of Kansas are now capable of producing 4,500,000 barrels daily to satisfy a demand which approximates 175,000 barrels. We must admit that this total State potential is inflated, but nevertheless, it does reflect the fact that we are able to produce daily, without injury to our wells, more than the amount of crude oil that we can sell.

And may I interpose there that our present market demand in our State is less or nearly 4 percent of that amount of reserves.

We recognize the necessity of maintaining large underground reserves of oil and they must, of course, be adequate to assure a sound national and state defense. It must also be remembered that it takes considerable time to extract these reserves and that future consumption by the public will undoubtedly increase as it has in the past. I feel that the State conservation acts promote the maintenance of adequate reserves and assure a surplus of available supply to permit restriction at nonwasteful rates. Certainly the present surplus in Kansas demonstrates that we are capable of satisfying any increased or emergency demand for our oil.

The cost of production of a barrel of oil varies considerably between pools and even between wells within pools. The depth of the formation below the surface, the nature and amount of the reservoir energy, and the reluctance or ease with which any particular formation gives up its oil, all effect the costs of production. Although these conditions are not subject to control, it is also evident that an unregulated or unrestricted rate of production distorts costs even more than natural field conditions. Production under the rule fo capture created extraordinary low costs per barrel during the flush period of a well and correspondingly high costs thereafter. In fact, this cost variance between wells and pools exceeds that of all other commodities and disturbs the ordinary function of price in its attempt to balance supply with demand.

As a general proposition, and especially in flowing fields, the cost of producing a barrel of oil will range from a few cents in its flush stage to upwards of a dollar in its settled stage.

I might add there that is very true from tests made in our State.

It can easily be seen that oil produced at a cost of ten cents a barrel can usurp the outlets for oil produced at a dollar a barrel. We have always been and are now faced with the problem of whether it is good conservation to permit the pools with the lowest costs to obtain all the crude oil outlets and cause the abandonment of the remaining production, whether it be settled or stripper. I cannot conceive how it could be beneficial to the welfare of this country to cause the forced abandonment of fields which can produce oil for as little as 50 cents or a dollar a barrel. At least, this is what we are trying to prevent in Kansas.

The Honorable Payne Ratner, Governor of my State, in the statement which he has already presented to the committee, stressed the economic inportance of the oil industry to our State. Bearing in mind that this industry is a peramount industry in Kansas and that our present status is designed to promote the economic stability of that industry at a reasonable level as well as to prevent physical waste, I would like, at this time, to discuss briefly the economic effect of balancing supply and demand and the benefits to be gained from a sound program of surplus control.

Proration was, to a limited extent, inaugurated to avert the economic consequences of overproduction but the conservation aspect has increased progressively—especially since it was found that restricting the rate of production increased ultimate recovery and prevented underground waste. When you maximize the recovery from a field by restricting the flow, you also suppress overproduction. So you do the same thing to prevent physical waste that you do to control a surplus. It is a happy circumstance that measures calculated to prevent waste at the same time contribute to economic stability. However, the mere fact that the rate of production is decreased to prevent physical waste does not indicate that the amount of oil actually produced would bear any relation to consumption demand. If the industry is to enjoy a reasonable degree of stability so that it can develop adequate reserves, supply must be balanced with demand and the correlative rights of all producers to produce a fair and equitable amount of oil, must be recognized.

When the rate of production is reduced, the cost range of producing a barrel of oil as between wells is also reduced and this in turn smoothes the cost curve. When the variation between costs is lessened, the variation between prices at which the oil is offered for sale is also decreased. These facts exert a stabilizing influence upon price, especially when supply and demand are within reasonable balance. This principle holds not only for single pools, but for the country at large whenever production in the aggregate is restricted. A unique situation exists in that a manageable surplus had to be created to promote the most efficient and least wasteful operation of wells. After the development of the automobile, the industry was generally hard pressed to satisfy the rapidly increasing demand until 1926. New pools were exploited by unrestricted rates of production and, as a result, there were alternate periods of overproduction followed by shortages. Since 1926 supply has generally been materially in excess of demand and the difference between the two has gradually increased. The dire economic consequences which would result from unrestricted production at the present time can easily be imagined, especially in the light of the history of the oil business.

Increased ultimate yields not only represent a net gain from the conservation viewpoint, but they increase assets, lower exploration and development costs, and most noticeably reduce operating costs. A larger amount of oil can be produced by back pressure and a smaller percent lifted by pumping.

Some people have expressed the opinion that proration was merely a price-fixing scheme and that the public has been "held up" for petroleum products. My statement in that regard is prompted by the questions that have come from various persons in regard to it. A examination of the facts discloses that neither of these statements are true, although it must be admitted that the balancing of supply with demand has a tendency to stabilize the price of crude oil at reasonable levels. In 1920 motor fuel retailed for 30 cents and wholesaled at 23 cents in Tulsa, Okla., which is typical of the situation for the country. There was no gasoline tax. A decade later, motor fuel sold at 20 cents with the wholesale price about 7 cents. The institution of gasoline taxes, city, State, and Federal, was fairly well inaugurated by then and in the typical city happened to be 4 cents. Consequently, the actual retail price to the public was not 20 cents but 16 cents, a reduction of 47 percent since 1920, because a 4-cent gasoline tax was added.

Nevertheless, the spread between wholesale and net retail prices should be noted. In 1920, the spread was 7 cents, but in 1930 it was 9 cents. The wholesale price is really the industry's net-back in marketing gasoline, its principal money product. Considering then the wholesale price of gasoline, the reduction from 1920 to 1930 was from 23 cents to 7 cents, or 70 percent. The institution of proration has been continuously in force since the flood of crude from the Seminole and other pools in 1926, and yet the record does not show that the public has been injured by it.

Now another decade has elapsed. Comparable figures for retail gasoline are more difficult to ascertain because there are three different grades of different quality, whereas in 1930 there were only two principal grades and only one in 1920. Using the middle grade, or "company brand", we have a retail price of 17 cents, but only 12 cents excluding the gasoline taxes which have now risen to 5 cents a gallon. This is an apparent decline of 60 percent since 1920 and 25 percent since 1930, in spite of the fact that the price of crude oil has risen materially from the bankrupt levels of 1931 to 1933.

The contribution of the oil industry to automotive advancement for the American public has been considerable and yet there is no way adequately to include quality improvement into a price series to reflect that. Turning now to the wholesale price of gasoline, the real net-back to the industry, we find the present figure at about 4½ cents. This compares with 7 cents in 1930 and 23 cents in 1920, declines of 36 and 80 percent, respectively—still remembering the improvement in the quality.

This factual, incontrovertible record of prices refutes the charge that proration has increased the public's cost of motor fuel and the same situation applies to the other petroleum products. Furthermore, the full savings to the public brought about by orderly and scientific rates of flow developed under the proration program, are far in excess of the figures cited above. Another 10 or 20 years may be necessary to enable us to measure the total gains in increased recovery, decreased expense, stabilizing prices and costs, and insuring the national safety and public convenience. The State programs are designed to afford reserves produced at nonwasteful rates that balance supply with demand.

The highest prices of the last 20 years were witnessed between 1920 and 1930 when the average price of crude oil was something like $1.75. There were violent fluctuations nearly every year which caused the industry to go through a complete economic cycle annually. Year after year crude prices reached $2. All this was before the institution of proration as we know it. In 1933, crude price levels were below the general index of raw material and grain prices. They have remained below parity with the two other indices ever since. The record clearly shows that compared with other raw materials and grain, crude price levels are relatively too low today. I am sure that you gentlemen will agree that there is no occasion for a substantial amount of an irreplaceable natural resource to sell for long below its cost of production and that the public interest is not best promoted by a continuation of such a situation.

As a State commission, we realize that we have not administered our conservation act perfectly, but we have honestly attempted to prevent waste as best we knew how. Personally, I am of the opinion that our regulations have been increasingly more effective. We are now able to and will conserve our crude oil and natural gas reserves to the fullest possible extent. The facts which are now known about proper production methods were discovered through the enforcement of State conservation statutes.

We have held numerous hearings to determine how to prevent waste in individual pools. Our orders in each instance comply with the best technical evidence available. May I digress there and say that since that technical information was made available, the exchange of studies, informative matter from compacting States, it will advance the progress of those who use it and is invaluable to the States in their regulatory work and should be encouraged rather than stifled and be subject to a lot of criticism. For example, in the Otis pool we established a volumetric system of withdrawal, prescribed gas-oil ratios, prohibited the venting of gas and the inefficient use of the reservoir energy. This investigation was initiated voluntarily by the commission and through our own experts we sought out the facts. As a result, we are today able to say to you that we have prevented the venting of 40,000,000 cubic feet of gas daily from that field, and have thereby increased the ultimate recovery of oil.

Combination wells which were producing as much as 150,000 cubic feet of gas per barrel of oil were ordered to be shut-in unless the ratio were reduced to 3,000 to 1. In compliance with the order, the operators in the pool installed bottom-hole chokes and other devices and reduced the excessively gas-oil ratios so that they fell within the provisions of the order. Some of the wells in the pool which produce only gas have given gas allowables under our gas conservation act, which was enacted in 1935, and oil allowables under the oil conservation act. Gas produced by the combination wells in excess of the gas-oil ratio must be returned to the reservoir or the oil allowables of such wells are reduced by amounts equivalent to the volume of space which the excess gas would occupy.

Gas companies are now willing to purchase the gas produced in the Otis pool, since they know that its gas reserves will not be dissipated. These purchasers have constructed a gas-treating plant, which cost in excess of $100,000, and which removes sulphur and other harmful chemicals from the gas, which is sour. This makes it merchantable for light, heat, and other domestic or industrial purposes. The Otis order has increased the ultimate recovery of both oil and gas for the pool and has prevented waste.

Some of the witnesses who have appeared for the bill have used the Burrton pool of Reno County, Kans., as an example of bad conservation practices. This field contains approximately 350 wells. Both gas and water pressure were available to reservoir energy. Most of the gas has now been exhausted, but, like other silicious limestone formations in Kansas, the field still possesses an unlimited hydrostatic water drive and, therefore, an unlimited reservoir energy. Silicious limestone formations are generally very porous and the permeability is such that the oil can be forced readily through the sand into the wells by the encroachment of water. Most of the wells in the Burrton field are combination wells. Considerable amounts of gas were vented into the air—and I want to especially say "were vented in the air." That has been in the past.

Shortly after the Kansas gas conservation act was enacted in 1935, we employed the Bureau of Mines to make an investigation in this pool and to report their recommendations in regard to any regulations needed to prevent waste. Over $4,000 were spent on the initial investigation. However, the Bureau did not recommend any specific plan for the prevention of waste in that pool. By the way, the commission waited for that report and was dependent upon that report. Subsequently, the commission instituted an investigation to determine whether the reservoir energy was being properly utilized and whether the gas was being wasted. We again hired the Bureau of Mines and paid them over $12,000 for their second investigation. Bottom-hole pressure tests were taken on all the wells, oil, potentials, gas open flows, gas-oil ratios, and water encroachment were measured and studied.

The recommendation of the Bureau of Mines was no different in this instance than formerly. However, the commission entered an order, after having spent some $16,000 with the Federal Government agency which had to be based upon the testimony and evidence of its own experts. We established a gas-oil ratio of 5,000 cubic feet of gas per barrel of oil produced and prescribed gas and oil allowables for all the wells.

We must admit that gas was wasted in the Burrton pool which should not have been wasted. At the same time we are secure in the knowledge that the Bureau of Mines was no more capable of preventing waste in that pool or of knowing how to prevent waste there, than we were. This demonstrates that the Federal Government cannot prevent waste as efficiently as the States. We assure you that there will be no more Burrton pool incidents in the State of Kansas and that we stand prepared to conserve the reservoir energy in our pools.

May I add there at this point, that at the present time under my present commission, of which I am head, in the State of Kansas, we are taking and have been in the course of taking for several months last past new potentials, a new test on every single well in Kansas, and that includes the fourteen or fifteen thousand stripper wells as well, and that report at some time down the line will be available and we will be glad to supply if request is made for it.

Our commission has issued orders restricting and regulating the production of gas and conserving the reservoir energy in the Lyons, Cunningham, Hugoten and other pools. In fact, our Cunningham order is viewed by many conservationists as an example of the best conservation practices. Well spacing within pools and the consideration of the acreage attributable to wells was first instituted by the commission in 1937 in the Zenith pool. I would like to present to the committee, at this time, the orders that the commission has issued for the Otis, Burrton, Lyons, Cunningham and Zenith pools and also copies of the rules and regulations which we have prescribed at various times. I offer these exhibits for identification so that they may become a part of the records of this hearing.

We hold monthly or periodic hearings in regard to all of the pools in the State so that we can be fully informed at all times. We have prescribed general rules and regulations for the conservation of our crude oil and natural gas at various times. These rules show, to a certain extent, the evolution of conservation in Kansas. I would like to call to your attention the rules and statutes appearing in the printed pamphlet, as well as the general rules which became effective.

These exhibits disclose that the commission has been diligent in the prevention of waste. We not only have laws relating to the conservation of crude oil and natural gas, but regulating the abandonment of oil and gas wells, disposal of salt water, repressuring and water flooding, and an act prohibiting the venting of natural gas. The oil conservation act, as it appears in the printed pamphlet, has been amended by chapter 227 of the laws of 1939. Those amendments are included in the exhibits which I have handed you.

The commission is required to report to the Governor of the State the work done by it during each biennium. Pages 81, 82, and 83 of our fourteenth biennial report describe the amount of work done by the commission and its conservation division. The numbers of hearings has increased considerably and we find that policing of our own State keeps us busy. So it is hard to see how one body in Washington could hope to regulate production in all the States as well as State agencies have, when even the States have their hands full.

Hearings are held for the purpose of enabling the commission to restrict production to prevent waste. Orders and reports are issued and served upon all producers operating in Kansas which establish gas and oil allowables for the pools and regulate the rates of production to prevent waste. I have brought several of these reports with me and would like to have them identified, and considered by the committee as a part of the record, if that is so desired.

Mr. Kelly. They may be made a part of the record.

Mr. Schoeppel. Sometime ago the commission concluded that the taking of physical potential tests on oil wells caused physical waste. It was found that wells could be tested by other methods without the necessity of producing them at high rates. The present rules of the commission provide that the ability of the wells to produce can be determined by taking what are commonly known as draw-down tests and by other accepted modern methods.

May I digress there to say that it has been the intention and practice of the State of Kansas in relation to its oil and gas industry to avail itself of all of the modern appliances and modern scientific methods in conserving our supplies and adequately checking all of these productions, pools and individual wells.

We have also established a well-spacing program which will promote the uniform development of our fields in the future. The acreage upon which wells are located is given consideration in determining the amount of oil they will be allowed to produce and to secure uniform withdrawals from each reservoir. Twenty acres spacing is the usual drilling pattern in Kansas at the present time, but we have provided for spacing as wide as forty acres wherever it is shown, after a hearing, that such development will promote conservation.

The oil States, and especially the State of Kansas, appreciate the assistance given to them by the Bureau of Mines in its forecasts of the probable consumptive demand. We appreciate the fact that the Congress has prevented the transportation in interstate commerce of oil produced in violation of state quotas. We need the benefits of the limitations imposed upon the importation of petroleum and its products, by the Federal Government, but we do not need Federal control.

We are convinced that there is no scarcity of oil and that there will not be even in the distant future. New reserves are being discovered and the discovery of such reserves is being promoted by the States. The Cole bill grants no power that is not conferred by the State statutes, while the States possess power not possessed by the Federal Government. The restriction of production to consumptive demand or economic needs is not mentioned in the Cole bill because the Federal Government does not have the power to include it. The States are better situated to prevent physical waste than is the Federal Government, and the State of Kansas will and has conserved its natural resources.

Therefore, we are opposed to the passage of the Cole bill. We hope that you will recommend that it be not passed.

(The exhibits above referred to are as follows:)

SENATE BILL NO. 185

AN ACT Relating to and regulating the production of crude oil, defining and prohibiting waste thereof, and conferring powers upon the state corporation commission relating thereto, amending sections S55-602 55-603, 55-604, 55-605, and 55-606 of the General Statutes of 1935, and repealing said original sections

Be it enacted by the Legislature of the State of Kansas:

SECTION 1. Section 55-602 of the General Statutes of 1935 is hereby amended to read as follows: "Sec. 55-602. That the term 'waste' as used herein, in addition to its ordinary meaning, shall include economic waste, underground waste, surface waste, waste of reservoir energy, and the production of crude oil or petroleum in excess of transportation or marketing facilities or reasonable market demands. The state corporation commission shall have authority to make rules and regulations for the prevention of such waste and for the protection of all fresh-water strata, and oil- and gas-bearing strata encountered in any well drilled for, or producing, oil. 'Person' as herein used shall mean any natural person, corporation, association, partnership, receiver, trustee, guardian, executor, administrator, and a fiduciary of any kind."

SEC. 2. Section 55-603 of the General Statutes of 1935 is hereby amended to read as follows: "Sec. 55-603. That whenever the full production from any common source of supply, herein called 'pool,' of crude oil in this state can only be obtained under conditions (*a*) constituting waste as herein defined, or (*b*) independently of waste, under conditions injurious to the respective correlative rights of the producers therein, or (*c*) under conditions unreasonably discriminating against other pools in the state, then any person having the right to drill into and produce oil therefrom may take therefrom currently no more than that proportion of all crude oil which may be produced therefrom, currently without waste, or without such injury, or without such discrimination, which the productivity of his well or wells considered in connection with the acreage reasonably attributable to each thereof bears to the productivity of all the wells therein considered in connection with the acreage reasonably attributable to each thereof. The state corporation commission is authorized, and it shall be its duty, to so regulate the taking of crude oil from any pool within the state of Kansas as to prevent waste therein or, independently of waste, to prevent the inequitable or unfair taking of crude oil therefrom by any person and to prevent unreasonable discrimination therein; and said commission is further authorized, and it shall be its duty, to prevent unreasonable discrimination in favor of any one pool as against any other pool or pools in this state in the allocation of allowable production among such pools: *Provided, however,* That nothing contained in this section or any other provision of this act shall authorize the reduction or limitation of the full production of crude oil from any pool in this state whose average well size is fifteen barrels per day or less, but the commission may require ratable taking by any purchaser therein from the properties with which it may be connected."

SEC. 3. Section 55-604 of the General Statutes of 1935 is hereby amended to read as follows: "Sec. 55-604. (*A*) The commission shall have and is hereby given jurisdiction and authority over all matters involving the application and enforcement of this act, and shall have authority to make and enforce rules, regulations, and orders for the prevention of waste as herein defined and for carrying out and enforcing each and all of the provisions of this act; and it is authorized to employ or appoint such agent or agents as may be necessary to enforce and administer the provisions of this act, and its rules, regulations, and orders; such agent or agents, with the exception of clerical help, to be a person or persons experienced in and conversant with the oil business; and, without limiting the generality of the foregoing powers and duties, the commission shall have the further power and authority hereinafter set forth: (*B*) The commission shall determine the reasonable market demand for crude oil produced in this state and shall allocate among the pools in the state the amount of oil that may be produced therein without waste, impairment of correlative rights, and unreasonable discrimination between pools. In making such determination of the reasonable market demand the commission shall take into consideration, among other proper factors, and give due and proper weight to the following: (*a*) The estimated consumer demand; (*b*) offers to purchase and the good faith thereof; (*c*) the price or prices offered in relation to the prevailing price of crude oil generally in the state: *Provided,* That nothing contained herein is intended to vest the commission with authority to fix the price of crude oil; and in making such allocation among the pools in the state the commission shall take into consideration among other proper factors, and give due and proper weight to the following: (*d*) The prevention of waste in any pool; (*e*) the quantity of oil that will be produced from nonprorated pools; (*f*) the ratio of the daily productive capacity of each prorated pool to the total daily productive capacity of all prorated pools in the state, after the commission shall have adjusted the said respective daily productive capacities of such pools by such method as the commission may find necessary so that the ratio when so adjusted and applied will result approximately in a fair and equitable allocation of the production among such pools, and as a basis for such adjustment of ratio, the commission shall make a classification of the prorated pools on the basis of the daily average productive capacities of the wells in such pools respectively, giving due consideration to the acreage reasonably attributable to each well, so that the respective pool classifications, in their order from the smallest to the largest, will be allocated a daily rate of production in percentages on a descending scale, but so as to result in a progressively increasing average daily allowed production in barrels per well from the smallest to the largest pool classification: *Provided, however,* Such reasonable adjustments may be made with respect to any pool or pools as the commission may find to be necessary under the practical circumstances; (*g*) the availability of pipe lines and other means of transportation; (*h*) the reasonable ability of each purchaser to satisfy his or its desire for oil produced in this state without concentrating purchases in any selected pool or pools, and the availability of oil to the various purchasers by exchange with or purchase from other purchasers of oil produced in this state; all to the end that so far as possible no producer or group of producers and no purchaser or group of purchasers shall have or be given any special favor or privilege, that the development and conservation of the oil resources of this state may be encouraged, and that the general walfare and prosperity of oil producers, royalty owners, and the general public in this state may be promoted. Such determination and allocation shall be made from time to time as circumstances may require. (*C*) In prorating the production allowed to each pool among the wells therein, the commission shall take into consideration, among such other factors as it may find proper, and give due and proper weight to: (*a*) the productivity of each such well as determined by such reasonable method as the commission shall adopt for the pool; (*b*) the acreage of each well owner which is reasonably attributable to each of his wells; and (*c*) the efficient utilization of the reservoir energy in the pool: *Provided*, That the allowable production of any well in any prorated pool shall not be reduced below fifteen barrels per day. (*D*) When it shall appear to the commission that those having a right to drill into and produce oil from any pool, part of any pool, or prospective pool, in this state, have unanimously agreed upon a plan for the development of said pool, part of any pool or prospective pool or for the distribution of allowed production therein, then the commission, after notice and hearing, may approve such plan and/or distribution."

SEC. 4. Section 55–605 of the General Statutes of 1935 is hereby amended to read as follows: "Sec. 55–605. Any person, or the attorney general on behalf of the state, or the state corporation commission on its own initiative, may institute proceedings before the commission upon any question relating to the enforcement of this act, or for the making, revocation, change, renewal, or extension, or for the enforcement of, any rule, regulation, or order thereunder, and jurisdiction is hereby conferred upon said commission to hear and determine the same. The commission shall set a reasonable time and place when such hearing shall be had, and give reasonable notice thereof, in no case less than ten days, to all persons interested therein by one publication of such notice, in some newspaper or newspapers having a general circulation in this state, and by mailing (second class) a copy thereof to each such person who shall have filed with the commission his name and address or whose name and address is otherwise made known to it. Each such notice shall state the time and place of hearing and contain such other information as will briefly and adequately disclose the matter to be considered or the relief sought. In case an emergency is found by the commission to exist which in its judgment requires the making of a rule, regulation, or order or taking an enforcement action, without first having a hearing, such emergency rule, regulation, order, or action shall have the same validity as if a hearing with respect to the same had been held after due notice, but same shall remain in force no longer than fifteen days from its effective date. In the exercise and enforcement of such jurisdiction said commission is authorized to summon witnesses, administer oaths, make ancillary orders, and use such mesne and final process, including inspection of records and books analogous to proceedings under its control over public-service corporations as now provided by law. In connection with the exercise and enforcement of its jurisdiction, the commission shall also have the right and authority to certify as for contempt to the district court of any county having jurisdiction, violations by any person of any of the provisions of this act or rules, regulations, or orders of the commission, and if it be found by said district court that such person, firm, or corporation has knowingly and willfully violated same, then such person shall be punished as for contempt in the same manner and to the same extent and with like effect as if such contempt had been of an order, judgment, or decree of the district court to which said certification is made."

SEC. 5. Section 55–606 of the General Statutes of 1935 is hereby amended to read as follows: "Sec. 55–606. Any action for judicial review of any rule, regulation, order, or decision of the commission may be brought against the commission in the district court of any county in the state wherein the property affected thereby is located, or, if the property affected thereby is located in different counties, then the jurisdiction shall lie in either of such counties. Before any such action may be brought by a person who was a party to the proceeding resulting in the making of a rule, regulation, order, or decision of the commission, a petition for rehearing shall first be filed with the commission within ten days from the date of the making of the rule, regulation, order, or decision in question. A rehearing shall be granted or denied by the commission within ten days from the date said petition is filed and if rehearing be not granted within ten days it shall be taken as denied. If rehearing be granted the matter shall be set for hearing as promptly as shall be convenient, and shall be determined by the commission within thirty days after the same shall be submitted. Such action may be brought by any person aggrieved, whether or not such person was the applicant for rehearing, within thirty days after the denial of the petition for rehearing, or, if rehearing is granted, then within thirty days after the final decision by the commission. If no petition for rehearing be filed, then any person aggrieved who shall not have been a party to any such proceeding before the commission may bring an action for the judicial review of any such rule, regulation, order, or decision of the commission at any time after ten days and within thirty days from the date of the making of such rule, regulation, order, or decision. Any rule, regulation, order, or decision of the commission may be superseded by the district court upon such terms and conditions as it may deem proper. All actions brought under this section shall have precedence in any court and on motion shall be advanced over any civil cause of different nature pending in such court, and such action shall be tried and determined as other civil actions. In any such action an abstract of the record of all evidence and proceedings before the commission shall be filed by the complaining party and a counter abstract may be filed by the commission or any other interested party. The district court may, when it deems it necessary and in the interest of justice, remand any such action to the commission with directions that the same be further investigated or additional evidence taken by the commission. After making such further investigation or receiving such additional evidence the commission may change, modify, or set aside the rule, regulation, order, or decision in question, and if the party who instituted the action for review in the district court shall not be satisfied with such decision, then upon written request of any such party, the commission shall make a report of its further investigation and final decision and send a certified transcript of such additional evidence as may have been tendered by any party in interest to the district court and thereupon the district court shall proceed to hear and determine the action upon the complete record. The court shall not be bound by any finding of fact made by the commission. The authority of the court shall be limited to a judgment either affirming or setting aside in whole or in part the rule, regulation, order, or decision of the commission. Appeals to the state supreme court may be taken from the judgment of the district court as in other civil actions. Nothing herein shall be construed in any manner to change, restrict, prohibit, or to deny to any person any of the usual equitable remedies."

Sec. 6. All valid rules, regulations, and orders of the commission, existing at the time this act takes effect and consistent with the provisions of this act, shall remain in force and effect unless revoked, changed, or modified by the commission pursuant to the provisions of this act. All such rules, regulations, and orders not consistent with the provisions hereof shall remain in force and effect, but only for such reasonable time as may be necessary for the commission to revoke, change, modify, or make a substitute for the same in accordance with the provisions hereof. All future proceedings in matters validly pending before the commission at the time this act takes effect shall be in accordance with and pursuant to the provisions hereof.

Sec. 7. If any section, subsection, paragraph, sentence, provision, clause, or phrase of this act shall be held to be unconstitutional or invalid for any reason, it shall be presumed that this act would have been passed by the legislature without such invalid section, subsection, paragraph, sentence, provision, clause, or phrase, and such decision shall not in any way affect the remainder of this act.

Sec. 8. Sections 55-602, 55-603, 55-604, 55-605, and 55-606 of the General Statutes of 1935 are hereby repealed.

Sec. 9. This act shall take effect and be in force from and after its publication in the official state paper.

CONSERVATION DIVISION

The conservation division of the commission is maintained at Wichita, with offices in the Bitting Building. The division has immediate charge of the administration of the State conservation laws relating to oil, gas, and underground fresh-water supplies. These laws include the proration of oil and gas production, and also supervision of the plugging of abandoned wells to prevent damage to oil- and gas-bearing formations and the pollution or mineralization of fresh-water strata.

During the biennium the oil-potential production increased from 1,020,798 barrels on June 20, 1936, to 3,409,528 barrels on June 20, 1938. This potential production is prorated to prevent waste and bring production into reasonable line with consumption demand.

The various oil fields of the State are classified according to the average well production per field. In most of the fields, proration is on a sliding-percentage scale, based upon this field average. Wells having a daily potential of 15 barrels or less are permitted to produce at capacity. Certain fields are permitted to produce a minimum of 25 barrels per day. In July 1937, the commission instituted the composite withdrawal decline curve method of declining potentials monthly. Monthly hearings to determine the allowable production have been held in Wichita since July 1937.

Natural-gas problems demanded much attention by the commission during the biennium. A gas-wastage investigation of the Otis field in Barton and Rush Counties, instituted in May 1937, resulted in orders which curbed the gas-wastage and secured ratable taking. This investigation marked the first action in the administration of the gas statute. In July 1937 a gas-oil ratio investigation was started in the Burrton field in Reno and Harvey Counties which resulted in orders curbing the gas wastage. In October 1937 the Commission required natural-gas purchasers to submit monthly reports of gas purchases as the first step in enforcing H. R. 279, the gas-conservation law, in fields other than Otis and Burrton.

Much progress has been made in the administration of H. R. 280 and H. R. 278, relating to salt-water disposal, repressuring, and water flooding. Two men have been engaged constantly in the field in the enforcement of these laws.

Well-plugging supervision is done by field agents of the division. In the eastern part of the State the pluggers are paid on a fee basis, depending on the depth of the well. In western Kansas two men are devoting full time to the supervision of well plugging.

SALT WATER DISPOSAL ORDERS

[July 1, 1936, to July 1, 1938]

July 1 to Dec. 31, 1936	46
Jan. 1 to June 30, 1937	44
July 1 to Dec. 31, 1937	28
Jan. 1 to June 30, 1938	36

WATER REPRESSURING ORDERS

July 1 to Dec. 31, 1936	19
Jan. 1 to June 30, 1937	18
July 1 to Dec. 31, 1937	11
Jan. 1 to June 30, 1938	22

GAS ORDERS

July 1, 1936, to Jan. 1, 1937	None
Jan. 1 to July 1, 1937	None
July 1, 1937, to Jan. 1, 1938	7
Jan. 1 to June 30, 1938	11

PLUGGING DEPARTMENT

Number of wells plugged second 6 months of 1936	948
Receipts second 6 months of 1936	$15, 635. 47
Disbursements second 6 months of 1936	$14, 798. 06
Balance Jan. 1, 1937	$10, 418. 47
Number of wells plugged first 6 months of 1937	790
Receipts first 6 months of 1937	$12, 146. 85
Disbursements first 6 months of 1937	$11, 276. 28
Balance July 1, 1937	$11, 289. 04
Number of wells plugged second 6 months of 1937	966
Receipts second 6 months of 1937	$14, 394. 29
Disbursements second 6 months of 1937	$11, 437. 71
Balance Jan. 1, 1938	$12, 126. 45
Number of wells plugged first 6 months of 1938	833
Receipts first 6 months of 1938	$14, 268. 27
Disbursements first 6 months of 1938	$10, 297. 29
Balance July 1, 1938	$10, 848. 39

PRORATION ORDERS

July 1 to Dec. 31, 1936	19
Jan. 1 to June 30, 1937	8
July 1 to Dec. 31, 1937	30
Jan. 1 to June 30, 1938	65

Hearings held by the corporation commission in connection with proration, gas, salt-water disposal, and water repressuring were as follows:

July 1 to Dec. 31, 1936	None
Jan. 1 to June 30, 1937	5
July 1 to Dec. 31, 1937	15
Jan. 1 to June 30, 1938	68

GENERAL RULES AND REGULATIONS FOR THE CONSERVATION OF CRUDE OIL AND NATURAL GAS

(Prescribed by the Corporation Commission of the State of Kansas; also selected State and Federal conservation and commerce laws)

TOPEKA, KANS., *December 1, 1938.*

Issued by the corporation commission; E. R. Sloan, Topeka, commissioner, chairman; Ernest E. Blincoe, Fort Scott, commissioner; Homer Hoch, Marion, commissioner; Leo R. Price, Wichita, secretary; E. G. Dahlgren, Wichita, director, conservation division. Compiled by Innis D. Harris, Wichita, general attorney for the commission; John F. Jones, Topeka, assistant general attorney.

FOREWORD

This pamphlet contains the general rules and regulations promulgated by the Corporation Commission of the State of Kansas, by orders Nos. 38-09-23 and 38-11-30, in Dockets 14534, and 16028, relating to the conservation of oil and gas, the plugging of wells, the underground disposal of salt water, and the repressuring and water flooding of oil and gas properties.

These rules are the outgrowth of several years of experience wherein the administrative bodies and the industry have attempted to coordinate the best practices in the industry with the legislative authority as contained in the statutes.

The statutes authorizing rules are printed herein, that the industry may by ready reference know the extent and limitation on the rule-making power. In addition to such specific statutes there are also included miscellaneous statutes of general interest in conservation matters, but there is no attempt to include all of the statutes affecting oil and gas matters.

GAS-CONSERVATION RULES

RULE 200. GENERAL AND SPECIAL RULES AND REGULATIONS

GENERAL RULES, REGULATIONS, AND ORDERS shall be state-wide in application unless otherwise specifically stated.

SPECIAL RULES, REGULATIONS, AND ORDERS will be issued when required and shall prevail as against GENERAL RULES, REGULATIONS, AND ORDERS if in conflict therewith.

RULE 201. DEFINITIONS

The terms used herein are defined as set out in Rule 101, with the exception of the following terms, which are defined as follows:

Allowable shall mean the amount of gas authorized to be produced by order of the Commission.

Assessment shall mean any charge against the parties involved in any hearing, application, investigation, or the enforcement of an order, and the assessment on each thousand cubic feet of gas produced to pay the cost incident to the administration of the gas-conservation act.

Gas shall mean the natural gas obtained from gas or combination wells regardless of its chemical analysis.

Gas, cubic foot, shall mean the volume of gas at a temperature of 60 degrees Fahrenheit required to fill one cubic foot of space under an absolute pressure of 16.4 pounds. In all computations of gas delivery it may be assumed that the gas obeys Boyle's Law governing the volume and pressure of the gases and that the flowing temperature is 60 degrees Fahrenheit. The volume of the gas shall be corrected for specific gravity, which shall be determined by the use of the balance method.

Gas, sour, shall mean gas which contains hydrogen sulphide, sulphur, or other deleterious substances in sufficient quantities to render it unfit for domestic light and fuel.

Gas well shall mean (1) a well which produces natural gas only in commercial quantities; (2) that part of a well wherein the gas producing stratum has been successfully cased off from the oil, the gas being produced through a Bradenhead and the oil through an inner string of casing or tubing, or (3) any well capable of producing gas in commercial quantities and also producing oil from the same common source of supply but not in commercial quantities.

Open flow shall mean the gas potential or the amount of gas which a well is capable of delivering to atmosphere during a 24-hour period.

Pipe line shall mean any pipes above or below the ground used or to be used for the transportation of gas.

Proration shall mean the regulation of the amount of production which may be produced without waste, and to prevent unratable taking and unreasonable discrimination as between operators, producers, and royalty owners within a common source of supply, and so as to permit each well or developed lease to ultimately produce approximately the amount of gas underlying a developed tract.

Storage shall mean produced gas confined in reservoirs.

Waste. See General Statutes of Kansas, 1935, section 55–701.

RULE 202. WASTE PROHIBITED

The production of gas in such manner and under such conditions, or any operation which causes or may cause preventable injury to any oil, gas, or fresh-water resource in the discovery or production of gas is hereby prohibited.

RULE 203. PRORATION

Whenever waste will be caused by the unregulated production from a common source of supply, or whenever the available production from a common source of supply is in excess of the market demand for gas from such common source of supply, each producer may produce from his well or wells such portion of the gas that may be produced without waste to be sold or used for lawful purposes as to permit each well or developed lease to currently produce proportionately with other wells or developed leases in such common source of supply, and to ultimately produce approximately the amount of gas underlying each developed tract or lease. In determining the allowable for a well the Commission may take into consideration the open flow, pressure, acreage containing the well and such other pertinent factors as may be necessary to accomplish the purpose of the gas conservation act.

RULE 204. POTENTIAL OPEN FLOW; TESTS

A. *When to be taken.* The potential open flow of all gas and combination wells, except those having an open flow of 750,000 cubic feet or less, shall be determined at least once each year and before such well shall be given an allowable.

B. *Method.* The potential open flow of a well may be ascertained by pilot-tube measurements, computed according to Reid's Tables, Bureau of Mines method, or by other recognized methods.

RULE 205. PRESSURE; TESTS

The pressure in each gas or combination well, except those having an open flow of 750,000 cubic feet or less, shall be determined as often as necessary to provide for ratable taking and before any such well shall be given an allowable.

RULE 206. SUPERVISION OF OPEN FLOW AND PRESSURE TESTS

All tests made in determining the potential open flow and pressure of a well and used in calculating the allowable to a well shall be made under the supervision of the Commission.

RULE 207. DURATION OF TESTS

The open flow and pressure tests shall continue for such duration and at such intervals as may be necessary to accurately determine the same.

RULE 208. NOTICE OF TESTS

The open flow and pressure tests may be witnessed or observed by a representative of any producer in the field and the owners of the adjoining or offset leases must be notified by the owner of the well on which a test is to be taken, stating the time when said test will commence.

RULE 209. GAS TO BE METERED

A. *Well, lease, or unitized property.* All gas when produced or sold shall be metered with an approved meter of sufficient capacity, provided that gas may be metered from a lease or unitized property as a whole if it is shown that ratable taking can be maintained; provided, further, meters shall not be required for gas produced and used on the lease for development purposes and lease operations.

B. *Meter charts and records.* Purchasers shall keep meter charts and records of gas purchased in a permanent file for a period of two (2) years, and such information shall be made available to the Commission.

C. *By-passes.* By-passes shall not be connected around meters in such manner as will permit the improper taking of gas.

RULE 210. REPORTS FROM GAS PURCHASERS

All purchasers of gas shall make a report each month to the conservation division stating the amount of gas purchased, the place of purchase, and such other pertinent information as required in the "Gas Purchasers Monthly Report" forms furnished by the Commission.

RULE 211. GAS-OIL RATIO

No well shall be permitted to produce gas in excess of the maximum ratio determined for a common source of supply unless all gas produced in excess thereof is returned to the common source of supply from which it was produced.

RULE 212. PIPE-LINE MAPS

Pipe-line maps indicating the location, size, extensions and any portions abandoned or not used shall be filed with the conservation division at the request of the director.

RULE 213. PRODUCTION AND USE OF SOUR GAS

A. *Limitation on production; when.* Sour gas shall not be produced in excess of the allowable where there are wells producing merchantable gas from the same common source of supply.

B. *Use of sour gas; exception.* Sour gas need not be used for the purposes defined in the statutes for merchantable gas if upon application and hearing is is found by the commission that it is not commercially feasible or practicable to treat such gas to make it merchantable.

RULE 214. USE OF GAS FOR OTHER THAN LIGHT OR FUEL

Before any person shall engage in the utilization of gas for purposes other that light and fuel he shall file with the commission a verified statement setting forth the names and addresses of the person or persons who are to engage in the proposed operation, the location of the plant or plants where the proposed utilization is to be carried on, the kind and the probable volume of the gas that is to be used, the reservoir from which it is to be taken, the general type of the process, and the kind and condition of the equipment that is to be used, the results to be obtained insofar as such results can be reasonably anticipated, and such other pertinent facts as the Commission may require.

Upon filing said statement the Commission may, if it deems the same necessary, conduct a public hearing with reference to the proposed utilization in order to determine whether such utilization or the use of the proposed processes and equipment will constitute waste prohibited by law.

RULE 215. GAS-CONSERVATION ASSESSMENT

An assessment to pay the conservation division expenses and other costs in connection with the administration of the gas-conservation laws, not otherwise provided for shall be made as follows:

(*a*) There shall be assessed against the persons involved a charge of five-hundredths of one cent (.05), or one-half mill on each one thousand cubic feet of gas produced, sold, marketed, or used each month. Said assessment shall apply only to the first purchase of gas, or the original taking from the well, and not to subsequent transfers commonly referred to as "tenderships."

(*b*) The first purchaser of the production, who is hereby defined to be the party paying for either or both any working interest or royalty interest, shall, before paying for the production, deduct five-hundredths of one cent or one-half mill for every one thousand cubic feet of gas produced and removed from the lease each month, and remit the amounts so deducted to the conservation division of the Commission at the same time and periods as said purchasers make their regular gas payments.

(*c*) Said remittances may be made each month in a single check if the purchaser so desires and no accounting by the purchaser shall be required except to show all deductions on the regular payment statements to producers and royalty owners or other parties in interest.

(*d*) The assessment herein provided for shall not apply to gas which is being returned to the ground for repressuring purposes within the field, but shall apply to such gas as is produced and removed from the lease and returned to the ground for storage purposes.

(*e*) This assessment shall not apply to gas taken from storage reservoirs nor to gas produced from any well with an open flow of 750,000 cubic feet or less per day where any such well is separately metered and reported.

Rules and Regulations for Plugging Wells

RULE 300. OIL, GAS, AND WATER TO BE PROTECTED

Before any well or any producing horizon encountered therein shall be abandoned, the owner or operator shall use such means, methods, and procedure as may be necessary to prevent water from entering any oil- or gas-bearing formations, and to protect any underground or surface water that is suitable for domestic or irrigation purposes from waste, downward drainage, harmful infiltration, and addition of deleterious substances.

RULE 301. NOTICE OF INTENTION TO ABANDON; SUPERVISION

Before any work is commenced to abandon any well drilled for the discovery of oil or gas, including any well drilled below the fresh-water level, except such holes as are described in rule 304, the owner or operator thereof shall give written notice to the director of his intention to abandon such well, which notice shall contain, among other things, the location of the well and when the abandonment will commence. The notice shall be upon forms prescribed by the Commission and shall contain all of the information requested thereon. Upon receipt of such notice the director shall send a duly authorized representative of the Commission to the location specified, to be present at the time indicated in such notice, to supervise the plugging of such well.

RULE 302. PLUGGING METHODS AND PROCEDURE

The methods and procedure for plugging a well shall be as follows:

A. The bottom of the hole shall be filled to the top of each producing formation, or a bridge shall be placed at the top of each producing formation, and in either event a cement plug not less than 15 feet in length shall be placed immediately above each producing formation whenever possible.

B. A cement plug not less than 15 feet in length shall be placed at approximately 50 feet below all fresh-water-bearing strata.

C. A plug shall be placed at the surface of the ground in each hole plugged in such manner as not to interfere with soil cultivation.

D. The interval between plugs shall be filled with an approved heavy mud-laden fluid.

E. An uncased rotary-drilled hole shall be plugged with approved heavy mud up to the base of the surface string, at which point a plug of not less than 15 feet of cement shall be placed. The hole shall also be capped similar to other abandoned holes.

F. The operator shall have the option as to the method of placing cement in the hole by (*a*) dump bailer, (*b*) pumping through tubing, (*c*) pump and plug, or (*d*) other method approved by the Commission.

RULE 303. AFFIDAVIT ON COMPLETION; COPIES

Within fifteen days after the plugging of any well has been accomplished, the owner or operator thereof shall file an affidavit with the Commission setting forth in detail the method used in plugging the well. Such affidavit shall be made on a form prescribed by the Commission. Copies of well-plugging records and affidavits will be furnished to any person requesting same on the payment of fifty cents per copy, except in the case of core drilling and seismic or other wells drilled for geological data.

RULE 304. SEISMIC CORE AND OTHER EXPLORATORY HOLES TO BE PLUGGED; METHODS; AFFIDAVIT

"Before any hole drilled for seismic, core, or other exploratory purposes and which said hole penetrates below the fresh-water formation is abandoned, it shall be the duty of the owner or driller of any such hole to plug the same in such manner as to properly protect all water-bearing formations; and within one year after such plugging, an affidavit shall be filed with the director by such owner or driller, setting forth the method used in protecting the water-bearing formations in the plugging of such hole."

RULE 305. WELLS USED FOR FRESH WATER

When the well to be plugged may safely be used as a fresh-water well, and such utilization is desired by the landowner, the well need not be filled above the required sealing plug set below fresh water: *Provided*, That written authority for such use is secured from the landowner and filed with the Commission.

RULE 306. COSTS

The owner or operator of a plugged well shall pay to the Commission on or before 30 days from the date of plugging, one cent per foot of well depth plugged: *Provided*, That the maximum charge shall be $25 and the minimum $5: *Provided*, That this rule shall not apply to the plugging of holes as described in rule 304.

Rules and Regulations for Underground Disposal of Salt Water

RULE 400 APPLICATION, APPROVAL, AND PLACE OF DISPOSAL

Salt water or other water containing minerals in such amount as to be unfit for domestic, stock, irrigation, or other general uses, upon application to, and approval by, the Commission may be disposed of by injection into the following formations:

A. Nonproducing zones of oil- or gas-bearing formations that contain water mineralized by processes of nature to such a degree that the water is unfit for domestic, stock, irrigation, or other general uses.

B. All nonproducing formations containing water mineralized by processes of nature to such a degree that the water is unfit for domestic, stock, irrigation, or other general uses: *Provided*, That before such formations are approved for disposal use, it shall be ascertained that they are separated from fresh-water formations by impervious beds which will give adequate protection to such fresh-water formations, and that fresh-water supplies contained by the proposed disposal formation near its outcrop shall be at such a remote distance as not to be endangered by addition of mineralized water in the proposed disposal wells.

The Commission, in passing upon applications for the use of nonproducing formations for disposal formations, will be advised by the technical recommendations of the State Geological Survey and the State Board of Health in determining whether such formations may be safely and legally used.

RULE 401. CASING AND CEMENT

Disposal wells shall be cased and the casing cemented in such manner that damage will not be caused to oil, gas or fresh water resources.

RULE 402. TRIAL TESTS; APPLICATION, CONTENTS AND APPROVAL

A. On application to and approval by the Commission, trial tests may be made in the manner and for such duration as the conditions justify and the Commission may permit.

B. The application for a trial test shall be verified and filed in triplicate with the Commission showing (1) the location of the disposal well, (2) location of wells and names of landowners and lessees within one-half mile of the disposal well, (3) description of formation and top and bottom depth where disposal water is to be injected, (4) elevation of the producing formations, (5) disposal well log and description of disposal well casing, (6) such other information as the Commission may require to ascertain whether the disposal may be safely and legally made. Trial test application forms may be obtained from the conservation division.

C. Approval for trial tests will be given by the Commission if after investigation it is found that the disposal may be safely made under the proposed plan.

D. Disposal water may not be injected into a disposal well for a longer period than a trial test without first complying with the requirements herein for permanent disposal.

RULE 403. PERMANENT DISPOSAL; APPLICATION, CONTENTS, NOTICE, OBJECTIONS, HEARING, AND APPROVAL

A. No disposal water shall be injected into a disposal well except for trial tests as provided in rule 402, until so ordered by the Commission pursuant to application and notice as herein required.

B. The application shall be verified and filed in triplicate with the Commission, showing (1) the location of the disposal well; (2) the location of all oil and gas wells, including abandoned and drilling wells and dry holes, and the names of the landowners and lessees within one-half mile of the disposal well; (3) the name, description and depth of the formation into which water is to be injected; (4) elevations of the top of the producing formation in the disposal well and in all producing wells within one-half mile radius if the disposal water is to be injected into a lower horizon of an oil- or gas-bearing formation; (5) disposal well log; (6) description of the disposal well casing; (7) location of wells producing water to be injected into the disposal well; (8) the estimated minimum and maximum amounts of water to be injected daily; (9) the names and addresses of operators notified of the application and the date that such notice was given; (10) such other information as the Commission may require to ascertain whether the disposal may be safely and legally made. Application forms may be obtained from the conservation division.

C. Applications may be made to include the use of more than one disposal well on the same lease or on more than one lease.

D. Applications shall be executed by all operators who are to participate in the proposed disposal plan.

E. Notice of the application shall be given by the applicant by mailing or delivering a copy of the application to each operator of producing and drilling wells within one-half mile radius of the proposed disposal well. Such notice shall be mailed or delivered on or before the application is mailed to or filed with the Commission.

F. Objections or complaints, stating the reasons why the proposed plan as contained in the application may cause damage to oil, gas, or fresh-water resources, must be filed within ten days after the application is filed.

G. In the event any such objection or complaint is filed or the Commission on its own motion deems that there should be a hearing on the application, a hearing shall be had after reasonable notice of the time, place, and subject matter of such hearing has been given to the parties in interest.

H. Orders approving the disposal plan will not be made within ten days of the filing of the application unless the written consent of all persons entitled to notice is filed with the Commission within such time.

RULE 404. NOTICE OF COMMENCEMENT AND DISCONTINUANCE OF DISPOSAL OPERATIONS

A. Immediately upon the commencement of disposal operations, the applicant shall notify the Commission of the same and the date of commencement.

B. Within ten days after the discontinuance of disposal operations the applicant or the one in charge thereof shall notify the Commission of the date of such discontinuance and the reasons therefor.

C. Before any disposal well shall be abandoned, notice shall be served on the director and the same procedure shall be followed in the plugging of such well as provided for the plugging of oil and gas wells.

RULE 405. ASSESSMENT OF COSTS

The applicant shall, within thirty (30) days after notice by the Corporation Commission, pay to such Commission $15 where only one lease is involved in the application, and in addition thereto, $5 for each additional lease involved.

RULES AND REGULATIONS FOR FLUID REPRESSURING AND WATER FLOODING OF OIL AND GAS PROPERTIES

RULE 500. WATER FLOODING; APPLICATION AND APPROVAL

The owner or operator of any well may inject water or other liquids under pressure into the formation containing oil or gas for the purpose of obtaining oil or gas from the reservoir, upon application to and approval by the Commission.

RULE 501. SAME; CASING AND CEMENT

Wells used for the injection of water into the producing formation or repressuring wells shall be cased with sound casing so as not to permit leakage and the casing cemented in such manner that damage will not be caused to oil, gas or fresh-water resources.

RULE 502. SAME; APPLICATION, CONTENTS, NOTICE, OBJECTION, HEARING AND APPROVAL

A. No liquid shall be injected into a well for flooding purposes until so ordered by the Commission pursuant to application and notice as herein required.

B. The application shall be verified and filed in triplicate with the Commission, showing (1) the location of the intake well; (2) the location of all oil and gas wells, including abandoned and drilling wells and dry holes, and the names of land owners and lessees within one-half mile of the intake well; (3) the formations from which wells are producing or have produced; (4) the name, description and depth of the formations to be flooded; (5) the open-hole depths of each formation to be flooded; (6) the elevations of the top of the oil- or gas-bearing formation in the intake well and the wells producing from the same formation within one-half mile radius of the intake well; (7) the log of the intake well or such information as is available; (8) descriptions of the intake well casing; (9) descriptions of the liquid stating the kind, where obtained and the estimated amounts to be injected daily; (10) the names and addresses of the operators notified of the application and the date that such notice was given; (11) such other information as the Commission may require to ascertain whether the flooding may be safely and legally made. Application forms may be obtained from the conservation division.

C. Applications may be made to include the use of more than one intake well on the same lease or on more than one lease.

D. Applications shall be executed by all operators who are to participate in the proposed flooding plan.

E. Notice of application shall be given by the applicant by mailing or delivering a copy of the application to each operator of drilling or producing wells or wells which have produced within one-half mile radius of the proposed intake well. Such notice shall be mailed or delivered on or before the application is mailed to or filed with the Commission.

F. Objections or complaints, stating the reasons why the proposed plan as contained in the application may cause damage to oil, gas, or fresh water resources must be filed within ten days after the application is filed.

G. In the event any such objection or complaint is filed or the Commission on its own motion deems that there should be a hearing on the application, a hearing shall be had after reasonable notice of the time, place and subject matter of such hearing has been given to the parties in interest.

H. Orders approving the flooding plan will not be made within ten days of the filing of the application unless the written consent of all persons entitled to notice is filed with the Commission within such time.

RULE 503. SAME; NOTICE OF COMMENCEMENT AND DISCONTINUANCE OF FLOODING OPERATIONS

A. Immediately upon the commencement of flooding operations the applicant shall notify the Commission of the same and the date of commencement.

B. Within ten days after the discontinuance of flooding operations the applicant or the one in charge thereof shall notify the Commission of the date of such discontinuance and the reasons therefor.

C. Before any intake well shall be abandoned notice shall be served on the director and the same procedure shall be followed in the plugging of such well as provided for the plugging of oil and gas wells.

RULE 504. SAME; RECORDS

The owner or operator of an intake well shall keep an accurate record of the amount of liquid injected into the intake well, and such information shall be made available to the Commission or its agents.

RULE 505. SAME; ASSESSMENT OF COSTS

The applicant shall, within 30 days after notice by the Corporation Commission, pay to such Commission $15 where only one lease is involved in the application, and in addition thereto $5 for each additional lease involved.

NOTE

General Rules and Regulations for Repressuring with air or gas have not been promulgated. Operators desiring to use such methods should conform to the rules and regulations for water flooding as may be applicable and the Commission will make such special orders as the conditions may justify.

APPENDIX

(Chart referred to filed with the committee.)

KANSAS STATUTES

General Statutes of Kansas, 1935

ARTICLE 6. CRUDE OIL OR PETROLEUM; PRODUCTION AND SALE

55–601. *Waste prohibited.*—That the production of crude oil or petroleum in the state of Kansas in such manner and under such conditions as to constitute waste is hereby prohibited and shall be unlawful.

55–602. *Waste defined; regulation by public service commission.*—That the term "waste" as used herein, in addition to its ordinary meaning, shall include economic waste, underground waste, surface waste, waste of gas energy and waste incident to the production of crude oil or petroleum in excess of transportation or marketing facilities or reasonable market demands. The public service commission shall have the authority to make rules and regulations for the prevention of such waste and for the protection of all freshwater strata, and oil- and gas-bearing strata encountered in any well drilled for or producing oil.

55–603. *Production regulated; discrimination of purchaser prohibited.*—That whenever the full production from any common source of supply of crude oil or petroleum in this state can only be obtained under conditions constituting waste as herein defined, then any person, firm or corporation having a right to drill into and/or produce oil from any such common source of supply may take therefrom only such proportion of all the crude oil and petroleum that may be produced therefrom, without waste, as the production of the well or wells of any such person, firm or corporation bears to the total production of such common source of supply. The public service commission is authorized to so regulate the taking of crude oil or petroleum from any one common source of supply within the state of Kansas as to prevent the inequitable or unfair taking from such common source of supply of such crude oil or petroleum by any person, firm, or corporation and to prevent unreasonable discrimination therein: *Provided*, That the power granted in this section shall not apply to wells from which the average daily production of crude oil or petroleum is less than fifteen (15) barrels per day.

55–604. *Gauging of wells to determine production: potential production; agents.*—That for the purpose of enforcing section 3 (55–603), said public service commission, under rules and regulations to be made by it, shall provide for a gauge of each well to determine its production, and the total production from the common source of supply, or by such rules and regulations to establish such other standard or standards as the commission may fix to determine the potential production of each well in the common source of supply and the total potential production of said common source of supply for the purpose of applying and enforcing the provisions of section 3 (55–603). The commission is hereby authorized to employ or appoint such agent or agents as may be necessary to enforce and administer the provisions of this act, such agent or agents, with the exception of clerical help, to be a person or persons experienced in and conversant with the oil business.

55–605. *Enforcement of act; jurisdiction of public service commission over proceedings and hearings; punishment for contempt.*—The public service commission shall have and is hereby given jurisdiction and authority over all matters involving the application and enforcement of this act, and shall have authority to make rules and regulations for the prevention of waste as herein defined. That any person, firm, or corporation or the attorney general on behalf of the state, may institute proceedings before the public service commission or apply for hearing before said commission upon any question relating to the enforcement of this act, or the enforcement of any rule or regulation promulgated thereunder by said commission, and jurisdiction is hereby conferred upon said commission to hear and determine the same. Said commission shall set a time and place when such hearing shall be had, and give reasonable notice thereof to all persons or classes interested therein by publication in some newspaper or newspapers having a general circulation in the state, and shall in addition thereto cause notice to be served in writing upon any person, firm or corporation complained against in the manner now provided by law for serving summons in civil actions. In the exercise and enforcement of such jurisdiction said commission is authorized to summon witnesses, make ancillary orders, and use such mesne and final processes, including inspection of records, books, and analogous to proceedings under its control over public service corporations as now provided by law. In connection with the exercise and enforcement of its jurisdiction, the commission shall also have the right and authority to certify as for contempt to the district court of any county having jurisdiction, violations by any person, firm or corporation of any of the provisions of this act, or orders of the commission, and if it be found by said district court that such person, firm or corporation has knowingly and willfully violated any order of the commission or the provisions of this act, then such person shall be punished as for contempt in the same manner and to the same extent and with like effect as if such contempt had been of the order, judgment, and decree of the district court to which said certification is made.

55-606. *Actions agianst public service commission.*—An action may be brought against the public service commission in the district court of the county wherein the property being administered is located, or, if the property being administered is located in adjacent counties, then the jurisdiction shall lie in either county. Such action may be brought by any person, firm or corporation shown to be interested therein, except the time for beginning such action shall be limited to thirty (30) days from the date of the order in question. Any order so attacked may be superseded only by the court, and after a hearing, upon such terms and conditions as there may be imposed. All actions brought under this section shall have precedence in any court, and on motion shall be advanced over any civil cause of different nature pending in such court, and such action shall be tried and determined as other civil actions.

55-607. *Penalty for violations of 55-601 to 55-609.*—That in addition to any penalty that may be imposed by the public service commission, any person, firm, or corporation, or any officer, agent, or employee thereof, directly or indirectly, violating the provisions of this act shall be guilty of a misdemeanor, and upon conviction thereof in a court of competent jurisdiction shall be punished by a fine in any sum not to exceed five thousand dollars ($5,000), or by imprisonment in the county jail not to exceed thirty (30) days, or by both fine and imprisonment.

55-608. *Injunction and other remedies.*—That the public service commission, the attorney general, or any county attorney in this state, shall have the right to maintain an action in any court of competent jurisdiction in this state to enforce by injunction, mandatory injunction, and any other appropriate and legal remedy, any valid rule, order or regulation made by the public service commission or promulgated under the provisions of this act, and the courts of general jurisdiction of this state shall have authority to make and render such judgments, orders and decrees, as may be proper to enforce any such rules, orders, and regulations made and promulgated by the public service commission.

55-609. *Cost; public service commission to assess.*—The public service commission is hereby authorized and directed to tax and assess against the parties involved in any hearing or application the cost incurred therein and also, all costs to the state of Kansas incurred in making necessary investigations and in enforcing its orders under this act and divide such costs among the parties in such proportion as is just and equitable.

55-609a. *Invalidity of 55-601 to 55-609.*—If any section, subsection, paragraph or provision of this act shall be held to be invalid by any court for any reason, it shall be presumed that this act would have been passed by the legislature without such invalid section, subsection, paragraph, or provision, and such finding or conclusion shall not in any way affect the remainder of this act.

55-610. *Buying or selling of illegally produced crude oil or petroleum unlawful.*—It is hereby declared to be unlawful for any person, firm or corporation to buy from or sell to any person, firm, or corporation crude oil or petroleum produced from any oil well or wells in this state in violation of any order, judgment or decree of courts of competent jurisdiction, or any order, rule or regulation of any body or agency authorized by law to conserve and regulate the production of crude oil or petroleum, or to take or produce crude oil or petroleum from any oil wells owned or operated by himself or others in violation of any order, judgment or decree of courts of competent jurisdiction, or of any order, rule, or regulations of any body or agency authorized by law to conserve and regulate the production of crude oil or petroleum.

55-611. *Penalties for violating 55-610 to 55-611.*—Any person, firm or the officials of any corporation violating the provisions of this act shall be guilty of a misdemeanor, and upon conviction in any court having jurisdiction of the offense, be punished by a fine not exceeding $500 or by confinement in the county jail not exceeding six months, or both. Each day's violations shall be considered a separate offense.

ARTICLE 7. PRODUCTION AND CONSERVATION OF NATURAL GAS

55-701. *Waste of natural gas prohibited.*—That the production of natural ga in the state of Kansas in such manner and under such conditions as to constitute waste is hereby prohibited.

55-702. *Definitions; rules and regulations authorized.*—That the term "waste" as herein used, in addition to its ordinary meaning, shall include economic waste, underground waste, and surface waste. Economic waste is defined to be the use of gas that is merchantable for light and fuel in any manner or process other than for light, fuel, carbon black manufacture and efficient chemical processes or repressuring purposes. The state corporation commission is hereby directed to make rules and regulations for the prevention of such wastes and for the protection of all water, oil or gas-bearing strata encountered in any well drilled for or producing oil or gas.

55-703. *Production regulations; discrimination of purchaser prohibited; rules and regulations authorized.*—That whenever the available production from the wells drilled into any common source of supply of natural gas in this state is in excess of the market demands for gas from such common source of supply, any person, firm, or corporation having the right to drill into and produce natural gas that may be produced therefrom without waste as will permit each well or developed lease to ultimately produce approximately the amount of gas underlying the land or lease on which such well is located and currently produce proportionately with the other wells in such common source of supply. The state corporation commission is directed to so regulate the taking of natural gas from any or all such common sources of supply within the state of Kansas as to prevent the inequitable or unfair taking from a common source of supply by any person, firm, or corporation and to prevent unreasonable discrimination in favor of any one common source of supply as against another and in favor of any producer in any such common source of supply. In promulgating rules, regulations, and formulas, to attain such results the commission shall give equitable consideration to the well open flow owned or controlled by the respective producers in such common source of supply under the existing conditions and circumstances. It is further provided that the state corporation commission shall make rules and regulations fixing the gas-oil-ratio of production to be allowed from wells producing both gas and oil: *Provided, however,* That the daily takes of gas from any well shall not exceed 25 percent of its open flow; *Provided further,* That the provisions of this act shall not apply to any well with an open flow of 750,000 cubic feet or less.

55-704. *Rules for determining production; agents.*—That for the purpose of enforcing section 3 (55-703) the state corporation commission is hereby directed to promulgate such rules and regulations as may be necessary to determine the open flow of each well, and the total open flow of the common source of supply, and by such rules and regulations to establish other standard or standards as the commission may fix to determine the open flow of each well in the common source of supply and the total open flow of said common source of supply for the purpose of applying and enforcing the provisions of this act. The state corporation commission is hereby directed to employ or designate agents as may be necessary to enforce and administer the provisions of this act, such agents with the exception of chemical (clerical) help to be experienced in and conversant with the gas business.

55-705. *Corporation Commission to make rules and regulations: notice of hearings.*—That the state corporation commission is hereby authorized and directed to promulgate rules and regulations to carry out the spirit and purpose of this act: *Provided, however,* That due notice shall be served upon the producers and purchasers of natural gas of any hearing or hearings which may be called for the purpose of establishing any facts upon which any proposed rule and regulation may be based.

55-706. *Jurisdiction of corporation commission over proceedings and hearings; powers conferred.*—That any person, firm, or corporation, or the attorney general, on behalf of the state, may institute proceedings before the state corporation commission for a hearing upon any question relating to the enforcement of this act, and jurisdiction is hereby conferred upon said commission to hear and determine the same; and the state corporation commission shall have and is hereby given jurisdiction and authority over all matters involving the application and enforcement of this act. Said commission shall set a time and place when and where such hearings shall be had and give reasonable notice thereof to all persons interested therein by publication in some newspaper having a general circulation in the state or in the official state paper, and in addition thereto, shall cause reasonable notice in writing by mail to be served upon any person, firm or corporation interested therein. In the enforcement and exercise of such jurisdiction said commission is authorized to determine any question or fact arising hereunder; to summon witnesses; make ancillary orders; and to use such mesne and final process including inspection of records, books and analogous to proceedings under its control over public utilities and common carriers as now provided by law.

55–707. *Appeals.*—That an appeal may be taken from any order by the state corporation commission made under the provisions of this act in the manner and form as now provided by law for taking appeals from orders made by said commission.

55–708. *Penalties for violation.*—That in addition to any penalty that may be imposed by the state corporation commission, any person, firm, or corporation, or any officer, agent or employee, thereof, violating the provisions of this act, or valid order rules or regulations of the commission shall be guilty of a misdemeanor, and upon conviction thereof shall be punished by a fine in any sum not exceeding $500, or by imprisonment in the county jail not exceeding six months, or by both fine and imprisonment.

55–709. *Injunction and other remedies.*—That the state corporation commission shall have the right to maintain an action in any court of competent jurisdiction in this state to enforce by injunction, mandatory injunction, and any other appropriate or legal or equitable remedy any valid rule, order, or regulation made by the state corporation commission or promulgated under the provisions of this act, and said court shall have the authority to make and render such judgments, orders and decrees as may be proper to enforce any such rules, orders, and regulations made and promulgated by the state corporation commission.

55–710. *Receivership upon violation of act.*—That in addition to any penalty imposed under the provisions of this act, and to the remedy and relief heretofore set forth, any person, firm or corporation violating the provisions of this act, valid order, rules or regulations of the commissions shall be subject to have his or its producing property placed in the hands of a receiver by a court of competent jurisdiction, at the suit of the state of Kansas through the attorney general, but such receivership shall only extend to the operating of producing wells and the marketing of natural gas under the provisions of this act.

55–711. *Assessment of costs.*—The state corporation commission is hereby directed to tax and assess against the parties involved in any hearing or application the costs incurred therein, also all costs to the commission incurred in making the necessary investigations and the enforcement of its orders under this act, and divide such costs among the interested parties in such proportion as may be just and equitable.

ABANDONMENT OF OIL AND GAS WELLS

55–128. *Duty of owner or operator before abandonment; rules and regulations; notice to corporation commission; affidavit, fee for copy.*—It shall be the duty of the owner or operator of any well which is now drilling or drilled or that may hereafter be drilled for the purpose of discovery of oil and gas, before abandoning same, to shut off and exclude all water from entering oil-bearing or gas-bearing sand, strata, or formation encountered in the well and to use every effort and endeavor to protect any underground or surface water suitable for domestic or irrigation purposes from infiltration or addition of any detrimental substances, in accordance with methods, rules and regulations adopted and promulgated by the state corporation commission and under its direction. Before any work is commenced to abandon any well, the owner or operator thereof shall give written notice to the state corporation commission or the agent of the commission as hereinafter designated, of his intention to abandon such well; the date upon which the work of abandonment shall begin; and that he will plug the well in accordance with the rules and regulations as prescribed by the commission. That within fifteen (15) days after the plugging of any well has been accomplished the owner or operator shall file an affidavit with the state corporation commission setting forth in detail the method he used in plugging the well. That thereafter the state corporation commission shall furnish a copy of said affidavit to any person requesting the same, upon payment of a reasonable fee therefor, to be fixed by the commission.

55–129. *Agents of corporation commission; qualifications.*—The state corporation commission is hereby authorized and directed to constitute and appoint such agent or agents as may be necessary to represent it and in its behalf in all matters in connection herewith. Said agent shall have had at least two years practical experience in oil production.

55–130. *Rules and regulations authorized.*—The state corporation commission is hereby directed to adopt such reasonable rules and regulations as may be necessary, and to provide the method by which said well or wells may be abandoned and plugged.

55–131. *Assessment of cost of supervision; deposit or bond.*—The state corporation commission is hereby authorized and directed to assess the actual costs and expenses incurred herein in the supervision of the abandonment of any well or wells affected by the terms of this act in a fair and equitable manner, and may in wells affected by the terms of this act in a fair and equitable manner, and may in its judgment require a cash deposit sufficient to cover such expenses prior to the abandonment of said well or wells, or a bond in such amount and under such terms as it may require.

55–132. *Penalties for violation of 55–128 to 55–131.*—Any person, owner, or operator violating any of the provisions of this act shall be deemed guilty of a misdemeanor, and shall be fined in the sum of not more than $500 or by imprisonment in the county jail of not more than six (6) months, or be subject to both fine and imprisonment.

General Statutes of Kansas, 1935, as Amended by Laws of Kansas, 1937, Chapter 265

DISPOSAL OF SALT WATER

55–901. *Disposal of salt water; regulations.*—That the owner or operator of any oil or gas well which may be producing and which produces salt water or waters containing minerals in an appreciable degree shall have the right to return said waters to any horizon from which such salt waters may have been produced, or to any other horizon which contains or had previously produced salt water or waters containing minerals in an appreciable degree: *Provided*, That the owner or operator of such well makes a written application to the state corporation commission for authority so to do, and written approval has been granted him after investigation by the state corporation commission: *And provided further*, That the state corporation commission is hereby directed to prescribe such rules and regulations as may be just and equitable to so carry out the provisions of this act: *And provided further*, That the state corporation commission is hereby directed to assess any cost that may be incurred under the provisions of this act against the applicant.

55–902. *Penalty for violations.*—Any person, owner, or operator violating any of the provisions of this act shall, upon conviction thereof, be deemed guilty of a misdemeanor and shall be fined in the sum of not more than $500 or by imprisonment in the county jail of not more than six (6) months, or be subject to both fine and imprisonment.

REPRESSURING AND WATER FLOODING

55–133. *Injection of air, gas, water, or fluids upon oil and gas properties; application required.*—The owner or operator of any well or wells which produces oil or gas from any sand, strata, or formation, shall be permitted in the interest of oil and gas conservation, to introduce and inject air, gas, water, or other fluid under pressure upon such sand, strata, or formation, for the purpose of recovering the oil and gas contained therein: *Provided*, That the owner or operator of a well into which water or other fluid is to be introduced into the sand, strata, or formation, shall make a written application to the state corporation commission for authority so to do, and written approval has been granted him by the state corporation commission: *And provided further*, That the operation shall be done under the rules and regulations of the commission.

55–134. *Rules and regulations authorized.*—The state corporation commission is hereby directed to prescribe such rules and regulations as are necessary to carry out the provisions of this act.

55–135. *Assessment of cost.*—The state corporation commission is hereby directed to assess any cost that may be incurred under the provisions of this act against all interested parties in such proportion as may be just and equitable.

MISCELLANEOUS KANSAS STATUTES

General Statutes of Kansas, 1935

ARTICLE 1. OIL AND GAS WELLS; REGULATORY PROVISIONS

55–102. *Natural-gas and oil wells; control and management; penalty.*—That it shall be unlawful for any person, firm, or corporation having possession or control of any natural gas or oil well, whether as a contractor, owner, lessee, agent, or manager, to use or permit the use of gas by direct well pressure for pumping of oil or for blowing oil out of wells, or for operating any machinery by direct well pressure or gas, or to allow or permit the flow of gas or oil from any such well to escape into the open air without being confined within such well or proper pipes or other safe receptacle for a longer period than two days after gas or oil shall have been struck in such well: *Provided,* That a reasonable time, not exceeding five days, shall be allowed such contractor, owner, lessee, agent, or manager, in addition to said two days, in which to place in said well the casing, tubing, packers, and other appliances necessary to properly operate the same and obtain the products therefrom; or in case such contractor, owner, lessee, agent, or manager shall not desire to operate such well, to securely enclose the same, so as to prevent the escape of oil or gas therefrom, and thereafter all such gas or oil shall be safely and securely confined in such well, pipes, or other proper receptacle: *And provided further,* That the provisions of this section shall not be construed to apply to the escape of gas or oil during continuous drilling. Any person violating any of the provisions of this section shall be deemed guilty of a misdemeanor, and shall be fined in the sum not less than fifty dollars nor more than two hundred dollars, or by imprisonment in the county jail for not less than thirty days nor more than six months, and each day that the violation continues shall constitute a separate offense.

55–103. *"Flambeau" lights; "jumbo" or similar burners.*—That it shall be unlawful for any company, corporation, or person for hire, pay, or otherwise, to use natural gas for illuminating purposes in what are known as "flambeau" lights in cities, towns, highways, or elsewhere: *Provided,* That nothing herein contained shall be so construed as to prohibit any such company, corporation, or person from the necessary use of such gas in what are known as "jumbo" burners enclosed in glass globes or lamps, or by the use of other burners of similar character so enclosed as will consume no more than said "jumbo" burners.

55–104. *Same; street lights to be turned off during day.*—All gaslights made through said "jumbo" burners enclosed in glass globes or lamps used in all public streets, and elsewhere outside of buildings, shall be turned off not later than eight o'clock in the morning each day such lights or burners are used, and the same shall not be lighted between the hours of eight o'clock a. m. and five o'clock p. m.

55–105. *Same; penalty.*—Any person, company or corporation violating any of the provisions of sections 2 (55–103) and 3 (55–104) of this act shall be deemed guilty of a misdemeanor, and fined in the sum of not less than fifty dollars nor more than two hundred dollars.

55–106. *Interference with pipes for gas; permission.*—That it shall be unlawful for any person, in any manner whatsoever, to change, injure, extend, or alter, or cause to be changed, injured, extended, or altered, any surface or other pipe or attachment of any kind connecting or through which natural or artificial gas is furnished from the gas mains or pipes of any person, company or corporation, without first procuring from such person, company or corporation written permission to make such change, extension, or alteration.

55–107. *Connections with gas mains; permission.*—That it shall be unlawful for any person to make or cause to be made any connection or reconnection with the gas mains or surface pipes of any person, company or corporation furnishing natural gas, or to turn on or off or in any manner interfere with any valve, stopcock or other appliance belonging to such person, company or corporation and connected with its surface or other pipes, or to alter or injure the orifice of mixers, or to use natural gas for heating purposes except through mixers, without first procuring from such person, company or corporation a written permit to turn on or off such stopcock or valve, or to make such connections or reconnections, or to alter or injure the orifice of mixers, or to interfere with the valves, stopcocks or other appliances of such person, company, or corporation as the case may be.

55–108. *Setting fire to escaping gas; interference with wells.*—That it shall be unlawful for any person or persons to set fire to any gas escaping from wells, broken or leaking mains, pipes, valves or other appliances used by any person, company or corporation in conveying gas, or to interfere in any manner with the wells, machinery or property of any person, company or corporation engaged in drilling for natural gas or in furnishing the same, unless employed by or acting under the authority or direction of such person, company, or corporation engaged in so furnishing gas.

55–109. *Penalty for violating 55–106 to 55–108; civil damages.*—Any person violating any of the provisions of sections 5 (55–106), 6 (55–107) and 7 (55–108) of this act shall be deemed guilty of a misdemeanor, and upon conviction shall be fined not less than twenty-five dollars nor more than one hundred dollars, and shall be liable to the said person, company or corporation whose property was so changed, injured, altered or destroyed, in a civil action for the amount of damages sustained, together with all the costs in the case.

55–110. *Gas or oil wells near railway.*—It shall be unlawful for any person, firm, company or corporation in this state to drill or operate gas or oil wells within one hundred feet of the center of the right of way of any steam or electric line of railway.

55–111. *Penalty for violating 55–110.*—Any person, firm, company or corporation violating the provisions of this act shall be deemed guilty of a misdemeanor, and upon conviction thereof shall be fined in any sum not less than one hundred nor more than one thousand dollars.

55–112. *Transportation of gas; pressure.*—That any person or persons, firm, company or corporation engaged in drilling for, piping, transporting, using or selling natural gas may transport or conduct the same through sound wrought or cast-iron or steel casings and pipes tested to at least four hundred pounds pressure to the square inch.

55–113. *Device to increase natural flow of gas.*—It is hereby declared to be unlawful for any person or persons, firm, company or corporation to use any device for pumping, or any other artificial process or appliance that shall have the effect of increasing the natural flow of natural gas out of any well: *Provided*, That nothing in this section contained shall apply to oil wells producing casinghead gas.

55–114. *Penalty for violating 55–112, 55–113. shooting of wells and use of acid.*—Any person or persons, firm, company or corporation violating any of the provisions of this act shall be deemed guilty of a misdemeanor, and upon conviction shall be fined in any sum not less than one hundred dollars or more than ten thousand dollars, and may be enjoined from conveying and transporting natural gas through pipes otherwise than in this act provided: *Provided*, That nothing in this section shall operate to prevent the use of nitroglycerin or other explosives for shooting nor the use of acid in acidizing any well or wells from which the gas is procured.

55–115. *Casing of oil and gas wells.*—That the owner or operator of any well put down for the purpose of exploring for and producing oil or gas shall, before drilling into the oil or gas-bearing rock, incase the well with good and sufficient wrought-iron oil-well casing, and in such manner as to exclude all surface or fresh water from the lower part of such well, and from penetrating the oil or gas-bearing rock. Should any well be put down through the first into a lower oil or gas-bearing rock, the same shall be cased in such manner as will exclude all fresh or salt water from both upper and lower oil or gas-bearing rocks penetrated.

55–117. *Penalty for violating 55–115 to 55–116.*—Any owner or operator or person who shall violate the provisions of the preceding sections of this act shall be guilty of a misdemeanor, and shall be fined in the sum of five hundred dollars for each and every offense, which fine when collected shall be paid to the school fund of the county in which the well is situated.

55–118. *Salt water or minerals to be excluded by casing and plugging.*—If any well or other excavation be put down to or through any vein or strata containing salt water or water containing any minerals in appreciable quantities, it shall be the duty of the owner or operator, driller or person putting down such well or excavation to case or plug such well or excavation in such manner as to exclude all salt water or water containing minerals in appreciable quantities from both upper and lower veins or strata holding water suitable for domestic purposes.

55–119. *Same; injunction.*—All persons, companies or corporations, private or municipal, owning or controlling a supply of water for domestic purposes, injured or threatened with injury by a violation of the provisions of section 1 (55–118) of this act, shall be entitled to a remedy by injunction, mandatory or prohibitive, in any court of competent jurisdiction against any person, company or corporation causing or threatening to cause such injury.

55–120. *Same; penalty.*—Any violation of section 1 (55–118) of this act shall be a misdemeanor, punishable by fine of not more than $1,000. Prosecutions under this act must be begun within six months after the commission of the offense.

55–121. *Salt water, oil or refuse from wells; prevention of escape.*—It shall be unlawful for any person, having possession or control of any well drilled, or being drilled for oil or gas, either as contractor, owner, lessee, agent or manager, or in any other capacity, to permit salt water, oil or refuse from any such well, to escape upon the ground and flow away from the immediate vicinity of such well, and it shall be the duty of any such person to keep such salt water, oil or refuse safely confined in tanks, pipe lines or ponds, so as to prevent the escape thereof: *Provided, however,* That this act shall not be construed to apply to the escape of salt water, oil, or refuse because of circumstances beyond the control of the person in the possession or control of such well and under circumstances which could not have been reasonably anticipated and guarded against.

55–122. *Penalty for violating 55–121.*—Any person knowingly or wilfully violating any of the provisions of the preceding section shall be deemed guilty of a misdemeanor, and upon conviction thereof shall be punished by a fine not exceeding one thousand dollars, or by imprisonment not exceeding one year, or by both such fine and imprisonment, and each day any such violation continues shall be deemed a separate offense.

AN INTERSTATE COMPACT TO CONSERVE OIL AND GAS

55–803. *"Interstate compact to conserve oil and gas" ratified.*—The "interstate compact to conserve oil and gas" entered into by the representatives of the state and the representatives of certain other oil-producing states at Dallas, Texas, on the sixteenth day of February 1935, is hereby ratified, approved and confirmed by the state of Kansas.

55–804. *Text of such compact.*—Said "interstate compact to conserve oil and gas" so ratified, approved and confirmed, is in words and figures as follows:

AN INTERSTATE COMPACT TO CONSERVE OIL AND GAS

Article I

This agreement may become effective within any compacting state at any time as prescribed by that state, and shall become effective within those states ratifying it whenever any three of the states of Texas, Oklahoma, California, Kansas, and New Mexico have ratified and congress has given its consent. Any oil-producing state may become a party hereto as hereinafter provided.

Article II

The purpose of this compact is to conserve oil and gas by the prevention of physical waste thereof from any cause.

Article III

Each state bound hereby agrees that within a reasonable time it will enact laws, of if laws have been enacted, then it agrees to continue the same in force, to accomplish within reasonable limits the prevention of:

(*a*) The operation of any oil well with an inefficient gas-oil ratio.

(*b*) The drowning with water of any stratum capable of producing oil or gas, or both oil and gas in paying quantities.

(*c*) The avoidable escape into the open air or the wasteful burning of gas from a natural-gas well.

(*d*) The creation of unnecessary fire hazards.

(*e*) The drilling, equipping, locating, spacing, or operating of a well or wells so as to bring about physical waste of oil or gas or loss in the ultimate recovery thereof.

(*f*) The inefficient, excessive or improper use of the reservoir energy in producing any well.

The enumeration of the foregoing subjects shall not limit the scope of the authority of any state.

Article IV

Each state bound hereby agrees that it will, within a reasonable time, enact statutes, or if such statutes have been enacted then that it will continue the same in force, providing in effect that oil produced in violation of its valid oil and/or gas conservation statutes or any valid rule, order, or regulation promulgated thereunder, shall be denied access to commerce, and providing for stringent penalties for the waste of either oil or gas.

Article V

It is not the purpose of this compact to authorize the states joining herein to limit the production of oil or gas for the purpose of establishing or fixing the price thereof, or create or perpetuate monopoly, or to promote regimentation, but is limited to the purpose of conserving oil and gas preventing the avoidable waste thereof within reasonable limitations.

Article VI

Each state joining herein shall appoint one representative to a commission hereby constituted and designated as "The Interstate Oil Compact Commission," the duty of which said commission shall be to make inquiry and ascertain from time to time such methods, practices, circumstances, and conditions as may be disclosed for bringing about conservation and the prevention of physical waste of oil and gas, and at such intervals as said commission deems beneficial it shall report its findings and recommendations to the several states for adoption or rejection.

The commission shall have power to recommend the coordination of the exercise of the police powers of the several states within their several jurisdictions to promote the maximum ultimate recovery from the petroleum reserves of said states, and to recommend measures for the maximum ultimate recovery of oil and gas. Said commission shall organize and adopt suitable rules and regulations for the conduct of its business.

No action shall be taken by the commission except: (1) by the affirmative votes of the majority of the whole number of the compacting states, represented at any meeting, and (2) by a concurring vote of a majority in interest of the compacting states at said meeting, such interest to be determined as follows: Such vote of each state shall be in the decimal proportion fixed by the ratio of its daily averate production during the preceding calendar half-year to the daily average production of the compacting states during said period.

Article VII

No state by joining herein shall become financially obligated to any other state, nor shall the breach of the terms hereof by any state subject such state to financial responsibility to the other states joining herein.

Article VIII

This compact shall expire September 1, 1937. But any state joining herein may, upon sixty days' notice, withdraw herefrom.

The representatives of the signatory states have signed this agreement in a single original which shall be deposited in the archives of the department of state of the United States, and a duly certified copy shall be forwarded to the governor of each of the signatory states.

This compact shall become effective when ratified and approved as provided in Article 1. Any oil-producing state may become a party hereto by affixing its signature to a counterpart to be similarly deposited, certified and ratified.

Done in the city of Dallas, Tex., this 16th day of February, 1935.

NOTE.—The compact was extended to September 1, 1939 by Laws of Kansas, 1937, chapter 264.

FEDERAL STATUTES

INTERSTATE TRANSPORTATION OF PETROLEUM PRODUCTS

(Connally Act)

715. *Purpose of chapter.*—It is hereby declared to be the policy of Congress to protect interstate and foreign commerce from the diversion and obstruction of, and the burden and harmful effect upon, such commerce caused by contraband oil as herein defined, and to encourage the conservation of deposits of crude oil situated within the United States.

715a. *Definitions.*—As used in this chapter (1) The term "contraband oil" means petroleum which, or any constituent part of which, was produced, transported, or withdrawn from storage in excess of the amounts permitted to be produced, transported, or withdrawn from storage under the laws of a state or under any regulation or order prescribed thereunder by any board, commission, officer, or other duly authorized agency of such state, or any of the products of such petroleum.

(2) The term "products" or "petroleum products" includes any article produced or derived in whole or in part from petroleum or any product thereof by refining, processing, manufacturing, or otherwise.

(3) The term "interstate commerce" means commerce between any point in a state and any point outside thereof, or between points within the same state but through any place outside thereof, or from any place in the United States to a foreign country, but only insofar as such commerce takes place within the United States.

(4) The term "person" includes an individual, partnership, corporation, or joint-stock company.

715b. *Interstate transportation of contraband oil forbidden.*—The shipment or transportation in interstate commerce from any state of contraband oil produced in such state is hereby prohibited. For the purpose of this section contraband oil shall not be deemed to have been produced in a state if none of the petroleum constituting such contraband oil, or from which it was produced or derived, was produced, transported, or withdrawn from storage in excess of the amounts permitted to be produced, transported, or withdrawn from storage under the laws of such state or under any regulation or order prescribed thereunder by any board, commission, officer, or other duly authorized agency of such state.

715c. *Suspension of operation of section 715b.*—Whenever the President finds that the amount of petroleum and petroleum products moving in interstate commerce is so limited as to be the cause, in whole or in part, of a lack of parity between supply (including imports and reasonable withdrawals from storage) and consumptive demand (including exports and reasonable additions to storage) resulting in an undue petroleum and petroleum products, he shall by proclamation declare such finding, and thereupon the provisions of section 715b shall be inoperative until such time as the President shall find and by proclamation declare that the conditions which gave rise to the suspension of the operation of the provisions of such section no longer exist. If any provision of this section or the application thereof shall be held to be invalid, the validity or application of section 715b shall not be effected thereby.

715d. *Rules and regulations: Certificates of clearance; issuance by boards; review of denial of certificate by board.*—(*a*) The President shall prescribe such regulations as he finds necessary or appropriate for the enforcement of the provisions of this chapter; including but not limited to regulations requiring reports, maps, affidavits, and other documents relating to the production, storage, refining, processing, transporting, or handling of petroleum and petroleum products, and providing for the keeping of books and records, and for the inspection of such books and records and of properties and facilities.

(*b*) Whenever the President finds it necessary or appropriate for the enforcement of the provisions of this chapter he shall require certificates of clearance for petroleum and petroleum products moving or to be moved in interstate commerce from any particular area, and shall establish a board or boards for the issuance of such certificates. A certificate of clearance shall be issued by a board so established in any case where such board determines that the petroleum or petroleum products in question does not constitute contraband oil. Denial of any such certificate shall be by order of the board, and only after reasonable opportunity for hearing. Whenever a certificate of clearance is required for any area in any state, it shall be unlawful to ship or transport petroleum or petroleum products in interstate commerce from such area unless a certificate has been obtained therefor.

(*c*) Any person whose application for a certificate of clearance is denied may obtain a review of the order denying such application in the United States District Court for the district wherein the board is sitting by filing in such court within thirty days after the entry of such order a written petition praying that the order of the board be modified or set aside, in whole or in part, A copy of such petition shall be forthwith served upon the board, and thereupon the board shall certify and file in the court a transcript of the record upon which the order complained of was entered. Upon the filing of such transcript, such court shall have jurisdiction to affirm, modify, or set aside such order, in whole or in part. No objection to the order of the board shall be considered by the court unless such objection shall have been urged before the board. The finding of the board as to the facts, if supported by evidence, shall be conclusive. The judgment and decree of the court shall be final, subject to review as provided in sections 225 and 347 of title 28.

715e. *Penalties for violation of chapter.*—Any person knowingly violating any provision of this chapter or any regulation prescribed thereunder shall upon conviction be punished by a fine of not to exceed $2,000 or by imprisonment for not to exceed six months, or by both such fine and imprisonment.

715f. *Forfeiture of contraband oil shipped in violation of law: Procedure.*—(*a*) Contraband oil shipped or transported in interstate commerce in violation of the provisions of this chapter shall be liable to be proceeded against in any district court of the United States within the jurisdiction of which the same may be found, and seized for forfeiture to the United States by a process of libel for condemnation; but in any such case the court may in its discretion, and under such terms and conditions as it shall prescribe, order the return of such contraband oil to the owner thereof where undue hardship would result from such forfeiture. The proceedings in such cases shall conform as nearly as may be to proceedings in rem in admiralty, except that either party may demand a trial by jury of any issue of fact joined in any such case, and all such proceedings shall be at the suit of and in the name of the United States. Contraband oil forfeited to the United States as provided in this section shall be used or disposed of pursuant to such rules and regulations as the President shall prescribe.

(*b*) No such forfeiture shall be made in the case of contraband oil owned by any person (other than a person shipping such contraband oil in violation of the provisions of this chapter) who has with respect to such contraband oil a certificate of clearance which on its face appears to be valid and to have been issued by a board created under authority of section 715d, certifying that the shipment in question is not contraband oil, and such person had no reasonable ground for believing such certificate to be invalid or to have been issued as a result of fraud or misrepresentation of fact.

715g. *Refusal of carrier to accept shipment without certificate of clearance. Certificate as justifying acceptance of shipment.*—No common carrier who shall refuse to accept petroleum or petroleum products from any area in which certificates of clearance are required under authority of this chapter, by reason of the failure of the shipper to deliver such a certificate to such carrier, or who shall refuse to accept any petroleum or petroleum products when having reasonable ground for believing that such petroleum or petroleum products constitute contraband oil, shall be liable on account of such refusal for any penalties or damages. No common carrier shall be subject to any penalty under section 715e in any case where (1) such carrier has a certificate of clearance which on its face appears to be valid and to have been issued by a board created under authority of section 715d; certifying that the shipment in question is not contraband oil and such carrier had no reasonable ground for believing such certificate to be invalid or to have been issued as a result of fraud or misrepresentation of fact, or (2) such carrier, as respects any shipment originating in any area where certificates of clearance are not required under authority of this chapter, had no reasonable ground for believing such petroleum or petroleum products to constitute contraband oil.

715h. *Hearings and investigation by boards; appointment of board and employees.*—(*a*) Any board established under authority of section 715d, and any agency designated under authority of section 715j, may hold and conduct such hearings, investigations, and proceedings as may be necessary for the purposes of this chapter, and for such purposes those provisions of section 78u of this title relating to the administering of oaths and affirmations, and to the attendance and testimony of witnesses and the production of evidence (including penalties), shall apply.

(*b*) The members of any board established under authority of section 715d shall be appointed by the President without regard to the civil-service laws but subject to sections 661 to 574 of title 5; and any such board may appoint, without regard to the civil-service laws but subject to sections 661 to 674 of title 5, such employees as may be necessary for the execution of its functions under this chapter.

715i. *Restraining violations; civil and criminal proceedings; jurisdiction of district courts; review.*—(*a*) Upon application of the President, by the attorney general, the United States district courts shall have jurisdiction to issue mandatory injunctions commanding any person to comply with the provisions of this chapter or any regulation issued thereunder.

(*b*) Whenever it shall appear to the President that any person is engaged or about to engage in any acts or practices that constitute or will constitute a violation of any provision of this chapter or of any regulation thereunder, he may in his discretion, by the attorney general, bring an action in the proper United States district court to enjoin such acts or practices, and upon a proper showing a permanent or temporary injunction or restraining order shall be granted without bond.

(*c*) The United States district courts shall have exclusive jurisdiction of violations of this chapter or the regulations thereunder, and of all suits in equity and actions at law brought to enforce any liability or duty created by, or to enjoin any violation of, this chapter or the regulations thereunder. Any criminal proceeding may be brought in the district wherein any act or transaction constituting the violation occurred. Any suit or action to enforce any liability or duty created by this chapter or regulations thereunder, or to enjoin any violation of this chapter or any regulations thereunder, may be brought in any such district or in the district wherein the defendant is found or is an inhabitant or transacts business, and process in such cases may be served in any other district of which the defendant is an inhabitant or wherever the defendant may be found. Judgments and decrees so rendered shall be subject to reveiw as provided in sections 225 and 347 of title 28.

715j. *"President" as including agencies, officers, and employees.*—Wherever reference is made in this chapter to the President such reference shall be held to include, in addition to the President, any agency, officer, or employee who may be designated by the President for the execution of any of the powers and functions vested in the President under this chapter.

715k. *Saving clause.*—If any provision of this chapter, or the application thereof to any person or circumstance, shall be held invalid, the validity of the remainder of the chapter and the application of such provision to other persons or circumstances shall not be affected thereby.

715l. *Duration of law.*—This chapter shall cease to be in effect on June 16, 1937.

FEDERAL STATUTES

Chapter 15B—National Gas Act (New)

717. *Necessity for regulation of natural gas companies.*—As disclosed in reports of the Federal Trade Commission, made pursuant to senate resolution 83 (seventieth congress, first session) and other reports made pursuant to the authority of congress. It is hereby declared that the business of transporting and selling natural gas for ultimate distribution to the public is affected with a public interest, and that federal regulation in matters relating to the transportation of natural gas and the sale thereof in interstate and foreign commerce is necessary in the public interest.

(*b*) The provisions of this chapter shall apply to the transportation of natural gas in interstate commerce, to the sale in interstate commerce of natural gas for resale for ultimate public consumption for domestic, commercial, industrial, or any other use, and to natural-gas companies engaged in such transportation or sale, but shall not apply to any other transportation or sale of natural gas or to the local distribution of natural gas or to the facilities used for such distribution or to the production or gathering of natural gas.

717a. *Definitions.*—When used in this chapter, unless the context otherwise requires—

(1) "Person" includes an individual or a corporation.

(2) "Corporation" includes any corporation, joint-stock company, partnership, association, business trust, organized group of persons, whether incorporated or not, receiver or receivers, trustee or trustees of any of the foregoing but shall not include municipalities as hereinafter defined.

(3) "Municipality" means a city, county, or other political subdivision or agency of a state.

(4) "State" means a state admitted to the Union, the District of Columbia, and any organized territory of the United States.

(5) "Natural gas" means either natural gas unmixed, or any mixture of natural and artificial gas.

(6) "Natural-gas company" means a person engaged in the transportation of natural gas in interstate commerce, or the sale in interstate commerce of such gas for resale.

(7) "Interstate commerce" means commerce between any point in a state and any point outside thereof, or between points with in the same state but through any place outside thereof, but only insofar as such commerce takes place within the United States.

(8) "State commission" means the regulatory body of the state of municipality having jurisdiction to regulate rates and charges for the sale of natural gas to consumers within the state or municipality.

(9) "Commission" and "commissioner" means the Federal Power Commission, and a member thereof, respectively.

717b. *Exportation or importation of natural gas.*—After six months from the date on which this chapter takes effect no person shall export any natural gas from the United States to a foreign country or import any natural gas from a foreign country without first having secured an order of the Commission authorizing it to do so. The Commission shall issue such order upon application, unless, after opportunity for hearing, it finds that the proposed exportation or importation will not be consistent with the public interest. The Commission may by its order grant such application, in whole or in part with such modification and upon such terms and conditions as the Commission may find necessary or appropriate, and may from time to time, after opportunity for hearing, and for good cause shown, make such supplemental order in the premises as it may find necessary or appropriate.

717c. *Rates and charges; schedule; suspension of new rates.*—(*a*) All rates and charges made, demanded, or received by any natural-gas company for or in connection with the transportation or sale of natural gas subject to the jurisdiction of the Commission, and all rules and regulations affecting or pertaining to such rates or charges, shall be just and reasonable, and any such rate or charge that is not just and reasonable is hereby declared to be unlawful.

(*b*) No natural-gas company shall, with respect to any transportation or sale of natural gas subject to the jurisdiction of the Commission, (1) make or grant any undue preference or advantage to any person or subject any person to any undue prejudice or disadvantage, or (2) maintain any unreasonable difference in rates, charges, service, facilities or in any other respect, either as between localities or as between classes of service.

(*c*) Under such rules and regulations as the Commission may prescribe, every natural-gas company shall file with the Commission, within such time (not less than sixty days from the date this chapter takes effect) and in such form as the Commission may designate, and shall keep open in convenient form and place for public inspection, schedules showing all rates and charges for any transportation or sale subject to the jurisdiction of the Commission, and the classifications, practices, and regulations affecting such rates and charges, together with all contracts which in any manner affect or relate to such rates, charges, classifications, and services.

(*d*) Unless the Commission otherwise orders, no charges shall be made by any natural-gas company in any such rate, charge, classification, or service, or in any rule, regulation, or contract relating thereto, except after thirty days' notice to the Commission and to the public. Such notice shall be given by filing with the Commission and keeping open for public inspection new schedules stating plainly the change or changes to be made in the schedule or schedules then in force and the time when the change or changes will go into effect. The Commission, for good cause shown, may allow changes to take effect without requiring the thirty days' notice herein provided for by an order specifying the changes so to be made and the time when they shall take effect the manner in which they shall be filed and published.

(*e*) Whenever any such new schedule is filed the Commission shall have authority, either upon complaint of any state, municipality, or state commission, or upon its own initiative without complaint, at once, and if it so orders, without answer or formal pleading by the natural-gas company, but upon reasonable notice, to enter upon a hearing concerning the lawfulness of such rate, charge, classification, or service; and, pending such hearing and the decision thereon, the Commission, upon filing with such schedules and delivering to the natural-gas company affected thereby a statement in writing of its reasons for such suspension, may suspend the operation of such schedule and defer the use of such rate, charge, classification, or service, but not for a longer period than five months beyond the time when it would otherwise go into effect: *Provided,* That the Commission shall not have authority to suspend the rate, charge, classification, or service for the sale of natural gas for resale for industrial use only; and after full hearings, either completed before or after the rate charge, classification, or service goes into effect, the Commission may make such orders with reference thereto as would be proper in a proceeding; initiated after it had become effective. If the proceeding has not been concluded and an order made at the expiration of the suspension period, on motion of the natural-gas company making the filing, the proposed change of rate, charge, classification, or service shall go into effect. Where increased rates or charges are thus made effective, the Commission may, by order, require the natural-gas company to furnish a bond, to be approved by the Commission, to refund any amounts ordered by the Commission, to keep accurate accounts in detail of all amounts received by reason of such increase, specifying by whom and in whose behalf such amounts were paid, and, upon completion of the hearing and decision, to order such natural-gas company, to refund, with interest, the portion of such increased rates or charges by its decision found not justified. At any hearing incolving a rate or charge sought to be increased, the burden of proof to show that the increased rate or charge is just and reasonable shall be upon the natural-gas company, and the Commission shall give to the hearing and decision of such questions preference over other questions pending before it and decide the same as speedily as possible.

717d. *Fixing rates and charges; determination of cost of production or transportation.*—(*a*) Whenever the Commission, after a hearing had upon its own motion or upon complaint of any state, municipality, state commission, or gas distributing company, shall find that any rate, charge, or classification demanded, observed, charged, or collected by any natural-gas company in connection with any transportation or sale of natural gas, subject to the jurisdiction of the Commission, or that any rule, regulation, practice, or contract affecting such rate, charge, or classification is unjust, unreasonable, unduly discriminatory, or preferential, the Commission shall determine the just and reasonable rate, charge, classification, rule, regulation, practice, or contract to be thereafter observed and in force, and shall fix the same by order: *Provided, however,* That the Commission shall have no power to order any increase in any rate contained in the currently effective schedule of such natural gas company on file with the Commission, unless such increase is in accordance with a new schedule filed by such natural gas company; but the Commission may order a decrease where existing rates are unjust, unduly discriminatory, preferential, otherwise unlawful, or are not the lowest reasonable rates.

(*b*) The Commission, upon its own motion, or upon the request of any state commission, whenever it can do so without prejudice to the efficient and proper conduct of its affairs, may investigate and determine the cost of the production or transportation of natural gas by a natural-gas company in cases where the Commission has no authority to establish a rate governing the transportation or sale of such natural gas.

717e. *Ascertainment of cost of property.*—(*a*) The Commission may investigate and ascertain the actual legitimate cost of the property of every natural-gas company, the depreciation therein, and, when found necessary for rate-making purposes, other facts which bear on the determination of such cost or depreciation and the fair value of such property.

(*b*) Every natural-gas company upon request shall file with the Commission an inventory of all or any part of its property and a statement of the original cost thereof, and shall keep the Commission informed regarding the cost of all additions, betterments, extensions, and new construction.

717f. *Extension of facilities; abandonment of service.*—(*a*) Whenever the commission, after notice and opportunity for hearing, finds such action necessary or desirable in the public interest, it may by order direct a natural-gas company to extend or improve its transportation facilities, to establish physical connection of its transportation facilities with the facilities of and sell natural gas to any person or municipality engaged or legally authorized to engage in the local distribution of natural or artificial gas to the public, and for such purpose to extend its transportation facilities to communities immediately adjacent to such facilities or to territory served by such natural-gas company, if the Commission finds that no undue burden will be placed upon such natural-gas company thereby: *Provided,* That the Commission shall have no authority to compel the enlargement of transportation facilities for such purposes, or to compel such natural-gas company to establish physical connection or sell natural gas when to do so would impair its ability to render adequate service to its customers.

(*b*) No natural-gas company shall abandon all or any portion of its facilities subject to the jurisdiction of the Commission, or any service rendered by means of such facilities, without the permission and approval of the Commission first had and obtained, after due hearing, and a finding by the Commission that the available supply of natural gas is depleted to the extent that the continuance of service is unwarranted, or that the present or future public convenience or necessity permit such abandonment.

(*c*) No natural-gas company shall undertake the construction or extension of any facilities for the transportation of natural gas to a market in which natural gas is already being served by another natural-gas company, or acquire or operate any such facilities or extensions thereof, or engage in transportation by means of any new or additional facilities, or sell natural gas in any such market, unless and until there shall first have been obtained from the Commission a certificate that the present or future public convenience and necessity require or will require such new construction or operation of any such facilities or extensions thereof: *Provided, however*, That a natural-gas company already serving a market may enlarge or extend its facilities for the purpose of supplying increased market demands in the territory in which it operates. Whenever any natural-gas company shall make application for a certificate of convenience and necessity under the provisions of this subsection, the Commission shall set the matter for hearing and shall give such reasonable notice of the hearing thereon to all interested persons as in its judgment may be necessary under rules and regulations to be prescribed by the Commission. In passing on applications for certificates of convenience and necessity, the Commission shall give due consideration to the applicant's ability to render and maintain adequate service at rates lower than those prevailing in the territory to be served, it being the intention of congress that natural gas shall be sold in interstate commerce for resale for ultimate public consumption for domestic, commercial, industrial, or any other use at the lowest possible reasonable rate consistent with the maintenance of adequate service in the public interest.

717g. *Accounts; records; memoranda.*—(*a*) Every natural-gas company shall make, keep, and preserve for such periods, such accounts, records of cost-accounting procedures, correspondence, memoranda, papers, books, and other records as the Commission may by rules and regulations prescribe as necessary or appropriate for purposes of the administration of this chapter: *Provided, however*, That nothing in this chapter shall relieve any such natural-gas company from keeping any accounts, memoranda, or records which such natural-gas company may be required to keep by or under authority of the laws of any state. The Commission may prescribe a system of accounts to be kept by such natural-gas companies, and may classify such natural-gas companies and prescribe a system of accounts for each class. The Commission, after notice and opportunity for hearing, may determine by order the accounts in which particular outlays or receipts shall be entered, charged, or credited. The burden of proof to justify every accounting entry questioned by the Commission shall be on the person making, authorizing, or requiring such entry, and the Commission may suspend a charge or credit pending submission of satisfactory proof in support thereof.

(*b*) The Commission shall at all times have access to and the right to inspect and examine all accounts, records, and memoranda of natural-gas companies; and it shall be the duty of such natural-gas companies to furnish to the Commission, within such reasonable time as the Commission may order, any information with respect thereto which the Commission may by order require, including copies of maps, contracts, reports of engineers, and other data, records, and papers, and to grant to all agents of the Commission free access to its property and its accounts, records, and memoranda when requested so to do. No member, officer, or employee of the Commission shall divulge any fact or information which may come to his knowledge during the course of examination of books, records, data, or accounts, except insofar as he may be directed by the Commission or by a court.

(*c*) The books, accounts, memoranda, and records of any person who controls directly or indirectly a natural-gas company subject to the jurisdiction of the Commission and of any other company controlled by such person insofar as they relate to transactions with or the business of such natural-gas company, shall be subject to examination on the order of the Commission.

717h. *Rates of depreciation.*—(*a*) The Commission may, after hearing, require natural-gas companies to carry proper and adequate depreciation and amortization accounts in accordance with such rules, regulations, and forms of account as the Commission may prescribe. The Commission may from time to time ascertain and determine, and by order fix, the proper and adequate rates of depreciation and amortization of the several classes of property of each natural-gas company used or useful in the production, transportation, or sale of natural gas. Each natural-gas company shall conform its depreciation and amortization accounts to the rates so ascertained, determined, and fixed. No natural-gas company subject to the jurisidction of the Commission shall charge to operating expenses any depreciation or amortization charges on classes of property other than those prescribed by the Commission, or charge with respect to any class of property a percentage of depreciation or amortization other than that prescribed therefor by the Commission. No such natural-gas company shall in any case include in any form under its operating or other expenses any depreciation, amortization, or other charge or otherwise under its operation or other expenses. Nothing in this section shall limit the power of the state commission to determine in the exercise of its jurisdiction, with respect to any natural-gas company, the percentage rates of depreciation or amortization to be allowed, as to any class of property of such natural-gas company, or the composite depreciation or amortization rate, for the purpose of determining rates or charges.

(*b*) The Commission, before prescribing any rules or requirements as to accounts, records, memoranda, or as to depreciation or amortization rates, shall notify each state commission having jurisdiction with respect to any natural-gas company involved and shall give reasonable opportunity to each such commission to present its views and shall receive and consider such views and recommendations.

717i. *Periodic and special reports.*—(*a*) Every natural-gas company shall file with the Commission such annual and other periodic or special reports as the Commission may by rules and regulations or order prescribe as necessary or appropriate to assist the Commission in the proper administration of this chapter. The Commission may prescribe the manner and form in which such reports shall be made, and require from such natural-gas companies specific answers to all questions upon which the Commission may need information. The Commission may require that such reports shall include, among other things, full information as to assets and liabilities, capitalization, investment, and reduction thereof, gross receipts, interest due and paid, depreciation, amortization, and other reserves, cost of facilities, cost of maintenance and operation of facilities for the production, transportation, or sale of natural gas, cost of renewal and replacement of such facilities, transportation, delivery, use and sale of natural gas. The Commission may require any such natural-gas company to make adequate provision for currently determining such costs and other facts. Such reports shall be made under oath unless the Commission otherwise specifies.

(*b*) It shall be unlawful for any natural-gas company wilfully to hinder, delay, or obstruct the making, filing, or keeping of any information, document, report, memorandum, record, or account required to be made, filed, or kept under this chapter or any rule, regulation, or order thereunder.

717j. *State compacts; reports on.*—(*a*) In case two or more states propose to the congress compacts dealing with the conservation, production, transportation, or distribution of natural gas it shall be the duty of the Commission to assemble pertinent information relative to the matters covered in any such proposed compact, to make public and to report to the Congress information so obtained together with such recommendations for further legislation as may appear to be appropriate or necessary to carry out the purposes of such proposed compact and to aid in the conservation of natural-gas resources within the United States and in the orderly, equitable, and economic production, transportation, and distribution of natural gas.

(*b*) It shall be the duty of the Commission to assemble and keep current pertinent information relative to the effect and operation of any compact between two or more states heretofore or hereafter approved by the Congress, to make such information public, and to report to the Congress, from time to time, the information so obtained, together with such recommendations as may appear to be appropriate or necessary to promote the purposes of such compact.

(*c*) In carrying out the purposes of this chapter, the Commission shall, so far as practicable, avail itself of the services, records, reports, and information of the executive departments and other agencies of the government, and the President may, from time to time, direct that such services and facilities be made available to the Commission.

717k. *Officials dealing in securities.*—It shall be unlawful for any officer or director of any natural-gas company to receive for his own benefit or indirectly, any money or thing of value in respect to the negotiation, hypothecation, or sale by such natural gas company of any security issued, or to be issued, by such natural gas company, or to share in any of the proceeds thereof, to participate in the making or paying of any dividends, other than liquidating dividends, of such natural-gas company from any funds properly included in capital account.

717l. *Complaints.*—Any state, municipality, or state commission complaining of anything done or omitted to be done by any natural-gas company in contravention of the provisions of this chapter may apply to the Commission by petition, which shall briefly state the facts, whereupon a statement of the complaint thus made shall be forwarded by the Commission to such natural-gas company which shall be called upon to satisfy the complaint or to answer the same in writing within a reasonable time to be specified by the Commission.

717m. *Investigations by commission; attendance of witnesses; depositions.*—(*a*) The Commission may investigate any facts, conditions, practices, or matters which it may find necessary or proper in order to determine whether any person has violated or is about to violate any provision of this chapter or any rule, regulation, or order thereunder, or to aid in the enforcement of the provisions of this chapter or any rule, regulation, or order thereunder or to aid in the enforcement of the provisions of this chapter, or in prescribing rules for recommending further legislation to the Congress. The Commission may permit any person to file with it a statement in writing, under oath or otherwise, as it shall determine, as to any or all facts and circumstances concerning the matter which may be the subject of investigation. The Commission, in its discretion, may publish in the manner authorized by section 825k of title 16, and make available to state commissions and municipalities information concerning any such matter.

(*b*) The Commission may, after hearing, determine the adequacy or inadequacy of the gas reserves held or controlled by any natural-gas company, or by anyone on its behalf, including its owned or leased properties or royalty contracts; and may also after hearing, determine the propriety and reasonableness of the inclusion in operating expenses, capital, or surplus of all delay rentals or other forms of rental or compensation, for unoperated lands and leases. For the purpose of such determinations, the Commission may require any natural-gas company to file with the Commission true copies of all its lease and royalty agreements with respect to such gas reserves.

(*c*) For the purpose of any investigation or any other proceeding under this chapter, any member of the Commission, or any officer designated by it, is empowered to administer oaths and affirmations, subpoena witnesses, compel their attendance, take evidence, and require the production of any books, papers, correspondence, memoranda, contracts, agreements, or other records which the Commission finds relevant or material to the inquiry. Such attendance of witnesses and the production of any such records may be required from any place in the United States or at any designated place of hearing. Witnesses summoned by the Commission to appear before it shall be paid the same fees and mileage that are paid witnesses in the courts of the United States.

(*d*) In case of contumacy by, or refusal to obey a subpoena issued to, any person, the Commission may invoke the aid of any court of the United States within the jurisdiction of which such investigation or proceeding is carried on, or where such person resides or carries on business, in requiring the attendance and testimony of witnesses and the production of books, papers, correspondence, memoranda, contracts, agreements and other records. Such court may issue an order requiring such person to appear before the Commission or member or officer designated by the Commission, there to produce records, if so ordered, or to give testimony touching the matter under investigation or in question; and any failure to obey such order of the court may be punished by such court as a contempt thereof. All process in any such case may be served in the judicial district whereof such person is an inhabitant or wherever he may be found or may be doing business. Any person who willfully shall fail or refuse to attend and testify or to answer any lawful inquiry or to produce books, papers, correspondence, memoranda, contracts, agreements or other records, if in his or its power so to do, in obedience to the subpoena of the Commission, shall be guilty of a misdemeanor and upon conviction shall be subject to a fine of not much more than $1,000 or to imprisonment for a term of not more than one year, or both.

(*e*) The testimony of any witness may be taken at the instance of a party, in any proceeding or investigation pending before the Commission, by deposition at any time after the proceeding is in issue. The Commission may also order testimony to be taken by deposition in any proceeding or investigation. Such depositions may be taken before any person authorized to administer oaths not being of counsel or attorney to either of the parties, nor interested in the proceeding or investigation. Reasonable notice must first be given in writing by the party or his attorney of record, as either may be nearest, which notice shall state the name of the witness and the time and place of the taking of his deposition. Any person may be compelled to appear and depose, and to produce documentary evidence, in the same manner as witnesses may be compelled to appear and testify and produce documentary evidence before the Commission, as hereinbefore provided. Such testimony shall be reduced to writing by the person taking deposition, or under his direction, and shall, after it has been reduced to writing, be subscribed by the deponent.

(*f*) If a witness whose testimony may be desired to be taken by deposition be in a foreign country, the deposition may be taken before an officer or person designated by the Commission, or agreed upon by the parties by stipulation in writing to be filed with the Commission. All depositions must be promptly filed with the Commission.

(*g*) Witnesses whose depositions are taken as authorized in this chapter and the person or officer taking the same, shall be entitled to the same fees as are paid for like services in the courts of the United States.

(*h*) No person shall be excused from attending the testifying or from producing books, papers, correspondence, memoranda, contracts, agreements, or other records and documents before the Commission, or in obedience to the subpena of the Commission or any member thereof or any officer designated by it, in any cause or proceeding instituted by the Commission, on the ground that the testimony or evidence, documentary or otherwise, required of him may tend to incriminate him or subject him to a penalty or forfeiture; but no individual shall be prosecuted or subjected to any penalty or forfeiture for or on account of any transaction, matter, or thing concerning which he is compelled to testify or produce evidence, documentary or otherwise, after having claimed his privilege against self-incrimination, except that such individual so testifying shall not be exempt from prosecution and punishment for perjury committed in so testifying.

717n. *Hearings; rules of procedure.*—(*a*) Hearings under this chapter may be held before the Commission, any member or members thereof, or any representative of the Commission designated by it, and appropriate records thereof shall be kept. In any proceedings before it, the Commission in accordance with such rules and regulations as it may prescribe, may admit as a party any interested state, state commission, municipality, or any representative of interested consumers or security holders, or any competitor of a party to such proceeding, or any other person whose participation in the proceeding may be in the public interest.

(*b*) All hearings, investigations, and proceedings under this chapter shall be governed by rules of practice and procedure to be adopted by the Commission, and in the conduct thereof the technical rules of evidence need not be applied. No informality in any hearing, investigation, or proceeding or in the manner of taking testimony shall invalidate any order, decision, rule, or regulation issued under the authority of this chapter.

717o. *Administrative powers of commission; rules, regulations, and orders.*—The Commission shall have power to perform any and all acts, and to prescribe, issue, make, amend, and rescind such orders, rules, and regulations as it may find necessary or appropriate to carry out the provisions of this chapter. Among other things, such rules and regulations may define accounting, technical, and trade terms used in this chapter; and may prescribe the form or forms of all statements, declarations, applications, and reports to be filed with the Commission, the information which they shall contain, and the time within which they shall be filed. Unless a different date is specified therein, rules and regulations of the Commission shall be effective thirty days after publication in the manner which the Commission shall prescribe. Orders of the Commission shall be effective on the date and in the manner which the Commission shall prescribe. For the purposes of its rules and regulations, the Commission may classify persons and matters within its jurisdiction and prescribe different requirements for different classes of persons or matters. All rules and regulations of the Commission shall be filed with its secretary and shall be kept open in convenient form for public inspection and examination during reasonable business hours.

717p. *Use of joint boards; cooperation with state commissions.*—(*a*) The Commission may refer any matter arising in the administration of this chapter to a board to be composed of a member or members, as determined by the Commission, from the state or each of the states affected or to be affected by such matter. Any such board shall be vested with the same power and be subject to the same duties and liabilities as in the case of a member of the Commission when designated by the Commission to hold any hearings. The action of such board shall have such force and effect and its proceedings shall be conducted in such manner as the Commission shall by regulation prescribe. The Board shall be appointed by the Commission from persons nominated by the state commission of each state affected, or by the governor of such state if there is no state commission. Each state affected shall be entitled to the same number of representatives on the board unless the nominating power of such state waives such right. The Commission shall have discretion to reject the nominee from any state, but shall thereupon make a new nomination from that state. The members of a board shall receive such allowances for expenses as the Commission shall provide. The Commission may, when in its discretion sufficient reason exists therefor, revoke any reference to such a board.

(*b*) The Commission may confer with any state commission regarding rate structures, costs, accounts, charges, practices, classifications, and regulations of natural-gas companies; and the Commission is authorized, under such rules and regulations as it shall prescribe, to hold joint hearings with any state commission in connection with any matter with respect to which the Commission is authorized to act. The Commission is authorized in the administration of this chapter to avail itself of such cooperation, services, records, and facilities as may be afforded by any state commission.

(*c*) The Commission shall make available to the several state commissions such information and reports as may be of assistance in state regulation of natural-gas companies. Whenever the Commission can do so without prejudice to the efficient and proper conduct of its affairs, it may, upon request from a state commission, make available to such state commission as witnesses any of its trained, rate, valuation, or other experts subject to reimbursement of the compensation and traveling expenses of such witnesses. All sums collected hereunder shall be credited to the appropriation from which the amounts were expended in carrying out the provisions of this subsection.

717q. *Appointment of officers and employees.*—The Commission is authorized to appoint and fix the compensation of such officers, attorneys, examiners, and experts as may be necessary to carry out its functions under this chapter, without regard to the provisions of other laws applicable to the employment and compensation of officers and employees of the United States; and the Commission may, subject to civil-service laws, appoint such other officers and employees as are necessary for carrying out such functions and fix their salaries in accordance with the classification of act of 1923, as amended.

717r. *Rehearings; court review of orders.*—(*a*) Any person, state, municipality, or state commission aggrieved by an order issued by the Commission in a proceeding under this chapter to which such person, state municipality, or state commission is a party may apply for a rehearing within thirty days after the issuance of such order. The application for rehearing shall set forth specifically the ground or grounds upon which such application is based. Upon such application the Commission shall have power to grant or deny rehearing or to abrogate or modify its order without further hearing. Unless the Commission acts upon the application for rehearing within thirty days after it is filed, such application may be deemed to have been denied. No proceeding to review any order of the Commission shall be brought by any person unless such person shall have made application to the Commission for a rehearing thereon.

(*b*) Any party to a proceeding under this chapter aggrieved by an order issued by the Commission in such proceeding may obtain a review of such order in the circuit court of appeals of the United States for any circuit wherein the natural-gas company to which the order relates is located or has its principal place of business, or in the United States Court of Appeals for the District of Columbia, by filing in such court, within sixty days after the order of the Commission upon the application for rehearing, a written petition praying that the order of the Commission be modified or set aside in whole or in part. A copy of such petition shall forthwith be served upon any member of the Commission and thereupon the Commission shall certify and file with the court a transcript of the record upon which the order complained of was entered. Upon the filing of such transcript such court shall have exclusive jurisdiction to affirm, modify or set aside such order in whole or in part. No objection to the order of the Commission shall be considered by the court unless such objection shall have been urged before the Commission in the application for rehearing unless there is reasonable ground for failure so to do. The finding of the Commission as to the facts, if supported by substantial evidence, shall be conclusive. If any party shall apply to the court for leave to adduce additional evidence, and shall show to the satisfaction of the court that such additional evidence is material and that there were reasonable grounds for failure to adduce such evidence in the proceedings before the Commission, the court may order such additional evidence to be taken before the Commission and to be adduced upon the hearing in such manner and upon such terms and conditions as to the court may seem proper. The Commission may modify its findings as to the facts by reason of the additional evidence so taken, and it shall file with the court such modified or new findings, which if supported by substantial evidence, shall be conclusive, and its recommendation, if any, for the modification or setting aside of the original order. The judgment and decree of the court, affirming, modifying, or setting aside, in whole or in part, any such order of the Commission, shall be final, subject to review by the supreme court of the United States upon certiorari or certification as provided in sections 346 and 347 of title 28, as amended.

(*c*) The filing of an application for rehearing under subsection (*a*) shall not, unless, specifically ordered by the Commission, operate as a stay of the Commission's order. The commencement of proceedings under subsection (*b*) of this section shall not, unless specifically ordered by the court, operate as a stay of the Commission's order.

717s. *Enforcement of chapter; regulations and orders.*—(*a*) Whenever it shall appear to the Commission that any person is engaged or about to engage in any acts or practices which constitute, or will constitute a violation of the provisions of this chapter, or any rule, regulation, or order thereunder, it may in its discretion, bring an action in the proper district court of the United States, the district court of the United States for the District of Columbia, or the United States courts of any territory or other place subject to the jurisdiction of the United States, to enjoin such acts or practices and to enforce compliance with this chapter or any rule, regulation, or order thereunder, and upon a proper showing a permanent or temporary injunction or decree or restraining order shall be granted without bond. The Commission may transmit such evidence as may be available concerning such acts or practices or concerning apparent violations of the federal antitrust laws to the attorney general, who, in his discretion may institute the necessary criminal proceedings.

(*b*) Upon application of the Commission the district courts of the United States, the district court of the United States for the District of Columbia, and the United States courts of any territory or other place subject to the jurisdiction of the United States shall have jurisdiction to issue writs of mandamus commanding any person to comply with the provisions of this chapter or any rule, regulation, or order of the Commission thereunder.

(*c*) The Commission may employ such attorneys as it finds necessary for proper legal aid and service of the Commission or its members in the conduct of their work, or for proper representation of the public interest in investigations made by it, or cases or proceedings pending before it, whether at the Commission's own instance or upon complaint, or to appear for or represent the Commission in any case in court; and the expenses of such employment shall be paid out of the appropriation for the Commission.

717t. *General penalties.*—(*a*) Any person who willfully and knowingly does or causes or suffers to be done any act, matter, or thing in this chapter prohibited or declared to be unlawful, or who willfully and knowingly omits or fails to do any act, matter, or thing in this chapter required to be done, or willfully and knowingly causes or suffers such omission or failure, shall upon conviction thereof, be punished by a fine of not more than $5,000 or by imprisonment for not more than two years, or both.

(*b*) Any person who willfully and knowingly violates any rule, regulation, restriction, condition, or order made or imposed by the Commission under authority of this chapter, shall, in addition to any other penalties provided by law, be punished upon conviction thereof by a fine not exceeding $500 for each and every day during which such offense occurs.

717u. *Jurisdiction of offenses; enforcement of liabilities and duties.*—The district courts of the United States, the district court of the United States for the District of Columbia, and the United States courts of any territory or other place subject to the jurisdiction of the United States shall have exclusive jurisdiction of violations of this chapter or the rules, regulations, and orders thereunder, and of all suits in equity and actions at law brought to enforce any liability or duty created by or to enjoin any violation of this chapter or any rule, regulation, or orders thereunder. Any criminal proceeding shall be brought in the district wherein any act or transaction constituting the violation occurred. Any suit or action to enforce any liability or duty created by, or to enjoin any violation of, this chapter or any rule, regulation, or order thereunder may be brought in any such district or in the district wherein the defendant is an inhabitant, and process in such cases may be served wherever the defendant may be found. Judgments and decrees so rendered shall be subject to review as provided in sections 225 and 347 of title 28. No costs shall be assessed against the Commission in any judicial proceeding by or against the Commission under this chapter.

717v. *Separability of provisions.*—If any provision of this chapter, or the application of such provisions to any person or circumstance, shall be held invalid, the remainder of the chapter, and the application of such provision to persons or circumstances other than those as to which it is held invalid, shall not be affected thereby.

717w. *Short title.*—This chapter may be cited as the "natural gas act."

Before the State Corporation Commission of the State of Kansas. In the matter of rules and regulations relating to the production, sale, and conservation of crude oil and natural gas in the Otis field, Barton and Rush Counties, Kans. Docket Nos. 14,534 and 16,028; Conservation Division Order No. 37-08-13—gas-oil ratio and ratable taking

ORDER

Now on this 13th day of August 1937, pursuant to a hearing held in the above-entitled matter at the Allis Hotel in Wichita, Kans., on June 29 and 30, 1937, and the submission of briefs the Commission being fully advised in the premises, finds as follows:

First: That waste of gas has been and is being committed in what is known as the Otis field, especially in the operation of combination wells.

Second: That said combination wells are producing oil and gas from a common source of supply.

Third: That the available production of gas from such common source of supply is in excess of market demands, and that the gas is not being marketed from the wells in said field in such proportion as the open flow potentials of the wells bears to the total open flow potentials of all the wells in such common source of supply.

Fourth: That gas has not and is not being taken ratably from the wells within the field.

Fifth: That each and every well in said field has an open flow of gas potentials in excess of 750,000 cubic feet per day.

Sixth: That in order to prevent inequitable or unfair takings, ratable taking of gas from all of the wells should be required, subject to the provisions of Rule 203.

Seventh: That in order to prevent waste, a gas-oil ratio should be established for said field as provided by law.

Eighth: That the evidence was conflicting as to what such gas-oil ratio should be, and shows that such ratio changes from time to time as the field is developed and conditions in the field change.

Ninth: That from all of the evidence a proper gas-oil ratio for the Otis field at the present time should not exceed 5,000 cubic feet of gas to each barrel of oil produced, provided, that if a larger amount of gas is produced in the production of oil than set out in the ratio herein established, such excess shall be returned to the formation from which it is produced.

Tenth: That the requirement for ratable taking would be satisfied if the gas purchased from said field were first taken from the combination wells, and thereafter, from such other well or wells as may be convenient if the gas taken from said combination wells is insufficient to provide for the total market demand; provided, that the producers of all wells in the field are compensated for the gas taken, in proportion to the gas potentials of each and every well in the field, the same as if the total amount of gas purchased had been taken ratably from each and every well separately.

Eleventh: That in such event the gas-oil ratio herein established, need not be operative, for the reason that the conservation of natural resources which said ratio is established to promote, would be met by keeping other wells in the field closed in, and that the requirement of equitable and fair taking would be met by ratable compensation, provided, that any such plan, before being made effective, shall be submitted and approved by the Commission.

Twelfth: That a hearing should be held for the purpose of determining the market demand for gas and fixing the gas allowables for wells in said field.

Thirteenth: That the costs incurred herein, including those incurred in the making of necessary investigation and the enforcement of this order, shall be assessed against the interested parties.

It is, therefore, by the Commission ordered, That the gas-oil ratio for the Otis Field be and the same is hereby established at not to exceed 5,000 cubic feet of gas to each barrel of oil, provided, that if a larger proportion of gas is produced in the production of oil than set out in the ratio herein estabilshed, such excess shall be returned to the formation from which it is produced.

It is further ordered, That ratable taking of gas from all wells in said field be and the same jis hereby required, subject to the provisions of Rule 203.

It is further ordered, That this order may be satisfied by making effective a plan which meets the requirements as provided in the tenth and eleventh findings herein.

It is further ordered, That a hearing be held on the 24th day of August 1937, at 2 p. m., in the ball room of the Allis Hotel in Wichita, Kans., for the purpose of determining the market demand for gas in the Otis field and fixing the gas allowables for the wells in said field.

It is further ordered, That the costs incurred herein, including those in making of an investigation and the enforcement of this order be assessed against the interested parties.

By the Commission it is so ordered.

Leo Shire, *Secretary.*

Before the State Corporation Commission for the State of Kansas. In the matter of the rules and regulations relating to the production, sale and conservation of crude oil and natural gas in the Burrton field, Reno and Harvey Counties, Kansas. Docket Nos. 16,028 and 14 534; Conservation Division. Order No. 38–1–29

ORDER

Pursuant to the provisions of the conservation laws of the State of Kansas prohibiting waste and providing for the regulation of the production of oil and gas, the Corporation Commission, after due notice, held public hearings in Wichita, Kans., on December 16, 17, and 20, 1937, with respect to the existence and imminence of the waste of natural gas and oil in the Burrton field, located in Reno and Harvey Counties, Kans., and with respect to the existence, imminence and prevention of undue drainage of natural gas between and underlying properties located therein, and with respect to the protection of correlative rights; and from the evidence adduced at said hearings and after due deliberation, the Commission finds as follows:

1. The Burrton oil and gas field is located in townships 23 and 24 south, ranges 3 and 4 west, in Reno and Harvey Counties, Kans. Production is obtained from three horizons, or three separate common sources of supply, in said field, namely, the Cherty section of the Mississippi limestone of the upper Mississippian age (which is locally called "chat" formation), the Hunton limestone of the Siluro Devonian age, and the Arbuckle (siliceous) limestone of the Ordovician age. It is Mississippi limestone, or chat formation, which contains large quantities of natural gas, together with oil, and is the common source of supply with which this order is concerned. The field was discovered on September 16, 1930, was developed rapidly, and has been one of the largest producers of oil and natural gas in the State of Kansas. It is the largest single area of Mississippi limestone production in the world. The field is approximately 14 miles long and over 2½ miles wide at the widest point, lying in a north-northeasterly to a south-southwesterly direction. The field narrows near the center to two 10-acre locations in width which, for purposes of description, divide the field into a north section and a south section, though both are part of the same common source of supply and inter-connected. In the center of each section is a gas cap, where larger quantities of gas are found, in proportion to oil, than near the edge of the field. Some wells producing large quantities of gas produce little or no oil.

2. There are approximately 315 wells producing from the chat formation in the Burrton field, many of which have an open flow in excess of 750,000 cubic feet of gas. The available production of natural gas from such wells as have an open flow of excess of 750,000 cubic feet is greatly in excess of the market demand and current requirements for lawful purposes notwithstanding said wells were to be produced at not to exceed 25 percent of the gas open flow. The market demand for gas from said field to be used for lawful purposes during the month of February 1938 is approximately 2,400,000,000 cubic feet and is materially less during the warmer months.

3. That such wells as have an open flow of gas less than 750,000 cubic feet also produce oil, and a restriction upon the amount of gas which may be produced from such wells is necessary to preserve the reservoir energy and obtain the greatest ultimate recovery of oil.

4. When the field was first discovered, the original pressure was approximately 1,050 pounds per square inch. At the present time, the pressure varies throughout the field from 1,050 pounds to 380 pounds, or less. The uneven pressure distribution through the reservoir may be attributed to; (1) uneven withdrawals and constant drainage from other developed leases; (2) water encroachment; (3) extension of the field into virgin areas. The greatest variations in pressure are between the center of the field, where the pressure is the lowest, and the edges of the field, where the pressure is the highest. The water encroachment appears to be rather uniform from all sides, moving toward the middle or the gas cap, and water is present in most of the wells in the field at the present time. The water encroachment has probably aided in the maintenance of reservoir pressure around the flank of the field.

5. The methods and manner in which natural gas and oil are now being produced in the Burrton field are such as to constitute waste, as the term "waste" is defined in articles 6 and 7, chapter 55, General Statutes of Kansas, 1935. Such waste has taken place in varying degrees of intensity since the discovery of the field, and a continuation of the practices and conditions that have caused, and are now causing, such waste is threatened and imminent. The waste heretofore and now existing in said field is of such substantial, destructive, and serious a nature as to jeopardize the private property rights of the several owners of mineral resources of said field and said waste materially affects the public interest, in that a continuation of the existing methods and manner of production will prematurely deplete the said field and will substantially lessen the ultimate recovery of the gas and oil therefrom.

6. That great volumes of merchantable gas have been wasted, blown to the air, and dissipated, and such waste is now taking place, though not to so great an extent as previously. Merchantable gas is being blown to the air from leases and vented to the air by gasoline plants. In some instances, gas is being metered on the lease and purchased, and then blown to the air to the irreparable injury of the public interest; that such waste has continued for several years and the amount of gas so wasted is indeterminable, but is greatly in excess of 10,000,000,000 cubic feet.

7. That there is now and that there has been for some time past, undue, preventable, and noncompensated drainage of the underlying gas from developed properties, tracts and leases to other such developed properties, tracts, or leases in and throughout said field, and that this undue, preventable, and noncompensated drainage has been brought about by disproportionate, nonuniform and unratable withdrawals of gas from wells located in said field, and that various developed properties in said field have suffered undue, premature and inequitable depletion by reason of such conditions.

8. That the inequitable, unfair and disproportionate production of the gas which is now taking place actually results in an unreasonable discrimination against various developed properties, denying to many owners of developed properties the opportunity to produce concurrently and proportionately with the owners of other wells in said field.

9. That the present methods and manner of production have caused pressure differentials to exist in said field, and that if said present methods and manner of production are permitted to continue, many wells or developed leases in said field will not ultimately produce approximately the amount of gas underlying the land or lease on which said wells are located.

10. That for the purpose of preventing waste as defined in articles 6 and 7, chapter 55, General Statutes of Kansas, and for the purpose of permitting the owners of each well or developed lease to ultimately produce approximately the amount of gas underlying the land on which such well is located, and to currently produce proportionately with other wells in the common source of supply, and to discharge the functions imposed by law, it is necessary to restrict the production of natural gas, and to provide for the ratable and equitable taking thereof. The total volume of gas to be produced from said field must be restricted to an amount that can be produced without waste and used for lawful purposes, and such volume must be distributed and allocated among the various wells of the field. Such distribution and allocation can be accomplished by applying the following formula, to wit: two-fifths of the allocation to the acreage containing the well; two-fifths of the allocation to the open flow potential of

the well; and one-fifth of the allocation to the observed pressure within the well. In other words, two-fifths of the total market demand for natural gas from the Burrton Field should be allocated to each well in the proportion as the acreage for each well bears to the sum of the total acreage for the field; two-fifths of the total market demand for natural gas from the Burrton field should be allocated to each well in the proportion as the open flow gas potential of each well bears to the sum of the open flow gas potentials of all the wells in the field; and one-fifth of the total market demand for natural gas from the Burrton field should be allocated to each well in the proportion as the observed pressure within each well bears to the sum of the pressure for all of the wells in the field. In determining the above formula, for the purpose of making gas allocations to wells in the Burrton field, pressure is not given the importance that it would normally have, because of existing physical conditions peculiar to the Burrton field, namely: the high hydrostatic pressure moving in around the edges of the field which modifies the importance of pressure in determining a formula which will permit the ratable production of approximately the amount of gas underlying the developed. lease

11. That the production of gas in accordance with the foregoing formula has a reasonable relation to the prevention of waste and a reasonable relation to the prevention of inequitable and unfair production of gas from the common source of supply and to the prevention of unreasonable discrimination in favor of one producer in said field and against another producer therein and that production of gas in such manner will in fact accomplish the purposes for which articles 6 and 7, chapter 55, General Statutes of Kansas, 1935, were enacted.

12. In the early states of development of said field, larger quantities of gas were found and the wells were drilled on 40-acre tracts. When larger quantities of oil were found, wells were located on 10-acre tracts. The acreage to be used in the said formula shall be determined by the number of acres in a developed lease on which a well is situated, provided that there is only one well on such lease. In the event more than one well is located on any such lease, the acres allotted to each well on such lease shall be determined by dividing the total number of acres by the number of wells, and the quotient thereof shall be allotted to each of said wells; provided, not to exceed 40 acres shall be used in computing the allowable on an acreage basis to any one well.

13. In determining the pressure factor to be used in the said formula, tests should be taken every 6 months, on or about the 15th of April and the 15th of October, and tests taken at such intervals will be reasonably frequent to prevent drainage and inequities and to protect correlative rights. The last pressure of record may be used until the next pressure readings are taken.

14. That many of the wells in said field produce oil in addition to gas, and that such wells should be given an oil allowable according to the rules and regulations governing the production of oil. Such wells should also be given a gas allowable according to the formula above described. The problem becomes more complicated when the total oil allowable cannot be taken without committing waste of gas or drainage of gas as between developed leases, or when the total gas allowable cannot be taken without committing waste of oil. There are two legislative acts—one prohibits the waste of the production of oil and provides for an oil allowable. This is found in article 6, chapter 55, General Statutes of Kansas, 1935. The other prohibits waste in the production of natural gas, prohibits drainage, and provides for a gas allowable. This is found in article 7, chapter 55, General Statutes of Kansas, 1935. A well which is capable of producing both oil and gas is given an oil allowable under Article 6, which prohibits waste including waste of reservoir energy, and requires ratable production within the market demand. Such well is also given a gas allowable under Article 7, which restricts production to prevent waste and drainage and requires ratable production within the market demand. When a well produces both oil and gas, it is restricted by the limitations of both Articles 6 and 7. Therefore, the right to produce oil from a well producing both oil and gas is restricted by the waste and drainage provisions of Article 7, as well as the waste provisions of Article 6. Likewise, the right to produce gas from a well producing both oil and gas is limited so as not to create waste of oil, including reservoir energy, and for the purpose of obtaining the greatest ultimate recovery. To preserve reservoir energy and obtain the greatest ultimate recovery, gas-oil ratios are established. The two Legislative Acts, namely: Articles 6 and 7 of Chapter 55—one providing for an oil allowable and the other for a gas allowable—may be harmonized. The purpose of the two Acts is primarily to prevent waste and should be read in that light. Therefore, if in the production of an oil allowable, waste of gas is created, or unreasonable drainage occurs, the prohibition of

the waste of gas and its drainage should be given effect as an additional limitation on the oil which might otherwise be produced; and if in the production of gas, waste of oil is created, the prohibition of the waste of oil, including the waste of reservoir energy, should be given effect as an additional limitation on the gas which might otherwise be produced.

15. The Commission further finds that the provisions of Article 6 and 7 for the prevention of waste and drainage and the protection of correlative rights will be satisfied by permitting a well having both a gas and an oil allowable to produce the said allowables either in oil or gas, or any combination of the two, according to the volume which the total allowable would occupy in the reservoir and for which there is a market.

16. The Commission further finds that the maximum gas-oil ratio for the purpose of conserving reservoir energy and obtaining the greatest ultimate recovery of oil should not exceed 5,000 cubic feet per barrel of oil; that in the event the total oil allowable for any well cannot be produced without producing more than the gas allowable for such well as determined by said formula, or that which may be produced on a volumetric withdrawal basis, additional gas may be produced provided that the total gas produced does not exceed the maximum gas-oil ratio of 5,000 to 1.

In the event the total oil allowable cannot be produced without producing more gas than is permitted by the said formula or by volumetric withdrawal or by a gas-oil ratio of 5,000 to 1, a greater amount of gas may be produced so as to permit the production of the full oil allowable provided that all gas in excess of that permitted by the three alternatives be returned to the reservoir.

17. The Commission is cognizant of the many difficulties in establishing an order that will at once prevent waste and undue drainage, meet the practical producing problems of the operators, and be susceptible to reasonable administration. It, therefore, further finds that the interested parties affected by this order should be given 15 days after the order becomes effective for such parties to make application to amend or modify this order.

It is, therefore, by the Commission ordered, That the reasonable lawful, required production of natural gas, including market demand nominations, for the purpose of making allocations to wells in the Burrton field, producing from the common source of supply known as the Mississippi Limestone or chat, for the month of February 1938 is 2,400,000,000 cubic feet.

It is further ordered, That the allowable production of gas for individual wells producing from said common source of supply in said field, shall be determined by dividing the total allowable production (which includes market demand) for the said common source of supply in said field into three parts; the first part to represent two-fifths; the second part, two-fifths; and the third part, one-fifth, of the total allowable production for said common source of supply in said field, and that the first part shall be allocated to each well in the proportion as the acreage for each well bears to the sum of the acreage for all of the wells producing from said common source of supply in said field; and the second part shall be allocated to each well in the proportion as the open flow gas potential for each well bears to the sum of the open flow gas potentials for all of the wells in said common source of supply in said field; and the third part shall be allocated to each well in the proportion as the observed pressure within each well bears to the sum of the observed pressure within all of the wells producing from said common source of supply in said field.

It is further ordered, That the acreage alloted to each well shall be determined by the number of acres in a developed lease on which such well is located, provided that there shall be one well on such lease. In the event more than one well is located on such lease, the acreage alloted or allocated to each well on such lease shall be determined by dividing the total number of acres by the number of wells on such lease, and the quotient thereof shall be allocated to each of said wells; provided, not to exceed 40 acres shall be used in computing the allowable on an acreage basis to any one well.

It is further ordered, That pressure tests shall be taken each 6 months, on or about the 15th of April and the 15th of October, and that the pressure revealed as the result of such tests shall be used in calculating the well allowable for the following 6 months and until subsequent tests are taken. The last pressure of record may be used in calculating the allowable for each well until the next pressure tests are taken.

It is further ordered, That the Commission will cause to be issued schedules setting forth, among other things, the name of the owner of the individual wells, the name of the lease, the well number, the acreage containing the well, the open flow gas potential, and the total monthly allowable production.

It is further ordered, That every producer and purchaser producing or taking gas from wells in said field shall prepare reports on forms furnished by the Commission, according to instructions contained within the reports, furnishing such information as is necessary for the administration of the regulations herein provided.

It is further ordered, That all wells, including those producing both gas and oil, and all gasoline plants, shall be equipped with meters, in order that the amount of gas produced from each well and the amount of gas, if any, vented to atmosphere will be accurately measured.

It is further ordered, That a well having both a gas and an oil allowable may produce said allowables either in oil or gas, or any combination of the two, according to the volume which the total allowable would occupy in the reservoir and for which there is a market.

It is further ordered, That the maximum gas-oil ratio for the purpose of conserving the reservoir energy and obtaining the greatest ultimate recovery of gas and oil shall not exceed 5,000 cubic feet to the barrel. The gas-oil ratio of each well in the field shall be kept as low as possible below the maximum, and no well producing both oil and gas shall be permitted to produce with an inefficient gas-oil ratio.

It is further ordered, That in the event the total oil allowable for any well cannot be produced without producing more than the gas allowable for such well as determined by the said formula, or that which may be produced on a volumetric withdrawal basis, additional gas may be produced provided that the total gas production does not exceed the maximum gas-oil ratio of 5,000 to 1, unless such excess be returned to the reservoir from which it was produced.

It is further ordered, That this order shall become and hereby is made effective as of February 1, 1938, at 7 o'clock, a. m.

It is further ordered, That this docket be kept open for the introduction of further evidence or information, so that the Commission may at any time modify or amend this order, or enter such other or further general or special orders as may be necessary to correct or relieve any inequality or inequity which may result from the enforcement of the provisions of this order.

By the commission it is so ordered.

[SEAL] LEO R. PRICE, *Secretary.*

Before the State Corporation Commission for the State of Kansas. In the matter of fixing gas allowables for the gas wells located in the Lyons Gas Field, Rice County, Kans. Docket No. "C"–261 Conservation Division

ORDER

Pursuant to Article 7, Chapter 55, General Statutes of Kansas, 1935, relating to the production and conservation of natural gas, authorizing and directing the State Corporation Commission to promulgate rules and regulations as will permit each developed lease to ultimately produce approximately the amount of gas underlying the same and to prevent unreasonable discrimination in favor of any producer in any common source of supply, the Corporation Commission after due notice served upon the producers and purchasers of natural gas in the Lyons Field, held a public hearing in the City of Wichita, Kans., on the 8th day of December 1938, with respect to the existence, imminence, and prevention of undue drainage of natural gas between and underlying properties located in the Lyons Field, which field is located in Rice County, Kans., and with respect to the protection of correlative rights.

There are at the present time four producing gas wells in the Lyons Field. All and each of said wells have an open flow of more than 750,000 cubic feet of gas. All of said wells take gas from the said Lyons Field which is a common source of supply of natural gas. The Cities Service Gas Company has its lines connected to and is purchasing gas from each and all of the above-mentioned gas wells. The available production from said wells so drilled in said common source of supply is greatly in excess of the market demand for gas from such common source of supply.

The Pulliam No. 1 Well, which is one of the above mentioned producing wells, has in the past been producing gas through the casing located in the said well. Another of the wells, namely the Pulliam No. 1–B Well, has been drilled and completed and is now taking large quantities of gas from a location very close to the said Pulliam No. 1 Well. The operations of the same have had the effect of reducing open flow and pressure of the Pulliam No. 1 Well, in addition to the taking and draining of gas from the said well.

There is now and has been undue, cognizable, preventable and noncompensated drainage of gas from developed properties, tracts and leases, to other such developed properties, tracts and leases in and throughout said Field, and this undue, cognizable, preventable and noncompensated drainage has been brought about by disproportionate, non-uniform and unratable withdrawals of gas from wells located in said Field; that various developed properties in said Field have suffered undue, premature and inequitable depletion by reason of such conditions and practices.

That under the Statutes heretofore cited and under the Commission's rules and regulations promulgated pursuant thereto, allowables should be fixed for each and all of the gas wells above referred to so as to permit each of the said wells and developed leases currently to produce proportionately with other wells and developed leases in the above-mentioned common source of supply and to ultimately produce approximately the amount of gas underlying the land or lease upon which said well is located. It is therefore necessary to regulate the production of natural gas and to provide for the ratable, equitable taking thereof in this field. The total volume of gas to be produced from said field according to the current market demands for lawful purposes must be distributed and allocated among the various wells of the field; such distribution and allocation can be accomplished by applying the following formula, to wit: three-fourths of the allocation to the product of the acreage containing the well by the observed pressure within the well, and one-fourth of the allocation to the open-flow potential of the well. In other words, three-fourths of the total market demand for natural gas from the Lyons field should be allocated to each well in the proportion as the product of acreage times pressure for each well bears to the sum of those products for all the wells in the Field, and one-fourth of the total market demand should be allocated to each well in the proportion as the open-flow gas potential of each well bears to the sum of the open-flow gas potential of all the wells in the Field.

The operation and enforcement of the above formula and the present indication of market demand of gas from the Lyons Field will be such that the daily production of gas of any of the said wells will not exceed 25 percent of their open flow.

That the production of gas in accordance with the foregoing formula has a reasonable relation to the prevention of inequitable and unfair production of gas from the common source of supply, and to the prevention of unreasonable discrimination in favor of one producer in said field and against another producer therein, and that the production of gas in such manner will in fact accomplish the purpose for which Article 7, Chapter 55, General Statutes of Kansas, 1935, was enacted.

The acreage to be used in the said formula shall be contiguous to that which contains the well, and shall be determined by the number of acres in the leased tract on which the well is situated, provided: that no well shall be allotted an acreage in excess of 80 acres. In the event more than one well is located on any one lease, the acres allotted to each well on such lease shall be determined by dividing the total number of acres by the number of wells and the quotient thereof shall be allotted to each of said wells. Eighty acres is hereby determined to be the maximum efficient drainage unit for the common source of supply.

In determining the pressure factor to be used in said formula, tests should be taken every six months, on or about the 15th day of January and the 15th day of July, and tests taken at such intervals will be reasonably frequent to prevent drainage and inequities and to protect correlative rights. The last pressure of record may be used until the next pressure readings are taken.

The open-flow factor is not given the weight or importance in the formula that acreage and pressure are given because the open flow may be affected by completion methods and the acidization of the producing formation which does not in itself affect the amount of gas which underlies the developed tract.

It Is Therefore by the Commission Ordered: That the market demand for natural gas in the Lyons Field be determined each and every month and that the allowable production of gas for individual wells in said Field shall be determined by dividing the total market demand for the field into two parts, the first part to represent three-fourths and the second part one-fourth of the total market demand for the field, and that the first part shall be allocated to each well in the proportion as the product of acreage containing the wells times the observed pressure at the well for each well bears to the sum of those products for all of the wells in the field; the second part or one-fourth of the total market demand for the field shall be allocated to each well in the proportion as the open-flow gas potential of each well bears to the sum of the open-flow gas potentials of all the wells in the Field.

It Is Further Ordered: That the acreage contained in each well shall be determined by the number of acres in the lease in which said well is situated, provided, that no well shall be given an acreage factor in excess of 80 acres. In the event more than one well is located on any one lease the acreage allocated to each well on such lease shall be determined by dividing the total number of acres by the number of wells and the quotient thereof shall be allocated to each of said wells.

It Is Further Ordered: That the pressure tests shall be taken each six months on or about the 15th day of January and the 15th day of July, and the pressure revealed as a result of such tests shall be used in calculating the well allowable for the following six months. Open-flow potential tests shall be taken on the same days and at the same time such pressure tests are taken, if the same is practicable.

It Is Further Ordered: That the Commission will cause to be issued schedules setting forth, among other things, the name of the owner of the individual wells, the name of the lease, the well number, the acreage containing the well, the open flow gas potential, and the total monthly allowable production. Every producer and purchaser shall prepare reports on forms furnished by the Commission, according to instructions, furnishing such information as is necessary for the administration of the regulations herein provided. All wells shall be equipped with meters and the amount of gas produced from each well shall be accurately measured; provided, that where more than one well is situated on a lease a meter for each well is not required if upon application and the proper showing the Commission finds that all the gas produced from the wells may be accurately measured so as to determine whether the production is ratable and without unreasonable discrimination.

It Is Further Ordered: That this order shall become and is hereby made effective as of January 1, 1939, at 7:00 o'clock a. m.

It Is Further Ordered: That this Docket shall be kept open for the introduction of further evidence or information so that the Commission may at any time modify or amend this order or enter such other or further general or special orders as may be necessary to correct or relieve any inequalities or inequities that may result from the enforcement of the provisions of this Order.

By the Commission It is so Ordered:

[seal] Leo R. Price, *Secretary.*

Before the State Corporation Commission of the State of Kansas. In the Matter of the Regulation of the Production of Natural Gas in the Cunningham Gas Field, in Kingman and Pratt Counties, Kans. Docket No. C–331.

BASIC PRORATION ORDER FOR THE CUNNINGHAM GAS FIELD

The above matter came on for hearings held on May 12, 13, and 25, 1939, and now, on this 28th day of June 1939, the Commission, being fully advised in the premises, finds:

1. Due and legal notice of said hearings was given as required by statute.
2. There is a common source of supply of natural gas in the Viola Lime formation, a part of the Ordovician series, at a depth of about 4,000 feet, which is now thought to cover about 12,000 acres of land in parts of Township 27 South, Ranges 10 and 11 West and Township 28 South, Ranges 11 and 12 West, in Kingman and Pratt Counties, Kansas, and which is known as the Cunningham Gas Field; that there are now eleven completed natural-gas wells therein; that said wells are each capable of producing in excess of 750,000 cubic feet of natural gas per day and all of said wells are capable of producing approximately 415,000,000 cubic feet per day and that the market demand for natural gas from said field is at this time approximately 4,000,000 cubic feet per day.
3. There exists disproportionate production from the wells and leases in said field, and, in order to protect the rights of all parties concerned, it is necessary for the Commission to assume jurisdiction and to prescribe regulations for the production of the gas from said wells and others that may be hereafter completed in said field to the end that each person, firm, or corporation having the right to drill into and produce natural gas in said field may take therefrom only such proportion of the amount that may be produed therefrom without waste as will permit each well or developed lease to produce ultimately approximately the amount of gas underlying the land or lease on which such well is located and currently produce proportionately with the other wells in said field.

4. That the amount of the existing market demand for gas in said field can be produced without waste and that the production of the wells therein whose owners avail themselves of the market outlet should be limited to the amount of the market demand for gas from said field; and should any well owner, such as the Drillers Gas Company, elect not to sell the production from his or its well or wells in the market outlet available generally to wells in the field, but instead to take the production from its said well or wells and sell or exchange same for gas produced elsewhere in the State or utilize the same non-wastefully or to transport same or have same transported away from the field, then, he or it shall nevertheless be restricted in allowed production from such well or wells in accordance with the same formula or standard which by this order is applied to the production from the wells of those who avail themselves of said market outlet, and, in this event, the total field allowed production shall be increased by the amount which will thus be allotted to such well or wells.

5. The Commission finds that the number of acres of a developed gas lease, herein called "acreage," is one of the most important factors in estimating or computing the gas reserves in the land covered by the lease and that to enable each developed lease to produce its share of the gas in the pool, the acreage factor of proration must be considered and duly weighed; that the respective twenty-four (24) hour shut-in pressures of the various wells and relative pressure changes from time to time as production proceeds is another important factor in the proration of gas production, particularly in determining whether drainage not equalized by counter drainage from developed property to developed property is or is not taking place, and that, by the use of the well-pressure factor, correction can be made from time to time in the allocation of allowed current production in order to prevent or diminish such drainage; that relative open-flow capacities of the various wells is also an important factor in determining the respective productivities of the various developed tracts, in that it is indicative of the relative porosity, permeability, and productive thickness of the formation where the various wells are located. It appears from the evidence that in this Cunningham field there are some wells of very large and some of relatively small potential capacity, and the Commission finds that in order to avoid giving undue weight to open-flow potentials and thus unduly favoring wells of high potentials and penalizing wells of low potentials in the proration of production, and working unfairness as between properties, the square roots of the respective potentials should be taken as the open-flow factor; and that when this is done and the acreage and pressure factors are properly considered therewith, and allocations of allowed production among the wells in this field are made on the basis of acreage times pressure times the square root of open-flow potential, it will be possible to attain the end set forth in the statute for current allowable production and ultimate recovery from the various developed properties.

6. That the method for determining the open-flow capacities of the respective wells in said field to produce natural gas shall be the back-pressure method evolved by the United States Bureau of Mines of the U. S. Department of the Interior and described in "Monograph 7," entitled "Back-Pressure Data on Natural-Gas Wells and Their Application to Production Practices," and which provides for plotting on logarithmic paper, called a chart, the data developed by the use of said method in the case of each well, and the open-flow potential at atmospheric pressure shall be computed from such chart in the case of each well. This method will greatly reduce the waste of gas into the atmosphere during the tests and also will furnish more accurate information than the usual open-flow tests provide for the relative abilities of the wells to deliver gas into the pipe-lines under normal operating conditions.

7. (a) That one well completed into said formation can adequately drain as much as 320 acres; but, there are a number of separately-owned tracts of land in the field which are 160 acres in size that considering the cost of drilling, equipping and operating one well in comparison with the estimated recovery per acre and the slow rate at which the production from this field can be ratably and non-wastefully marketed, the Commission finds that the standard unit, herein called "Proration Unit," for proration purposes in this field should be approximately 160 acres, but that, in any case where the size of the lease or property will permit, the unit may be larger than 160 acres, but it shall not be larger than approximately 320 acres, except upon order of the Commission after notice and hearing.

(b) Where heretofore or hereafter separately-owned leases or tracts of land, or parts thereof, are pooled or combined, same, within the acreage limits above specified, may, at the option of the owner or owners thereof, be treated as a single lease or tract for the purposes of this proration order. Owners of contiguous or adjacent leases, or parts thereof, or owners of tracts of land not leased or parts thereof, may, within said acreage limits, pool or combine such leases or tracts or portions thereof to form proration units under this order.

(c) Wells hereafter drilled shall be located in approximately the center of the acreage to be assigned to them, unless by reason of natural surface obstacles or in order to meet offset well distances it is necessary to locate same elsewhere on such acreage.

8. Each well shall be entitled to produce daily that amount of gas which bears the same ratio to the total field allowed production as the product of acreage times pressure times the square root of the open-flow capacity of such well bears to the sum of the products of acreage times pressure times the square root of the open-flow capacity of all the wells in said field.

9. (a) The open-flow capacities and the twenty-four hour shut-in pressures of the wells in said field shall be taken by or under the supervision of the gas engineer of the Conservation Division of the Commission, with the aid of the owner of the well. Prior to testing any well reasonable notice shall be given to owners of offset wells stating the time at which such test will be commenced. Written reports thereof signed by the persons taking and witnessing same, and approved by the Director or his agent who took or supervised same, shall be made and filed with the Director of the Conservation Division, forms for which shall be furnished by the Director. The acreage of each well shall be certified in writing by the owner of the well and filed with the Director. If the acreage assigned to any well should be increased or decreased at any time after the initial report thereon is made, such fact shall be promptly certified by the owner to the Director. Any operator in the field shall have the right to challenge the correctness of the acreage assigned to any well.

(b) As new wells are brought in, their respective open-flow capacities, pressures and acreage shall be taken, reported and certified in like manner.

(c) Once each year tests of the open-flow capacities in the manner aforesaid and the twenty-four hour shut-in pressures of all the wells in said field shall be made at approximately the same time, the next such annual tests to be made on all wells in the field in the month of June, 1940.

10. (a) As soon as the first taking of the capacities and pressures and certification of the acreage for the wells now in said field is completed as provided in paragraph 9 (a) above, the Director of the Conservation Division shall prepare a production schedule in accordance with the provisions of this order for the wells in said field and submit same to the Commission for approval, and upon the approval thereof said schedule shall take effect and be promulgated and the Director shall promptly furnish to each producer and purchaser in said field a copy thereof with a copy of this order, and they shall govern themselves accordingly in the subsequent operation of said wells.

(b) At such time and place as the Commission shall fix, the Commission will, after notice, conduct a hearing to determine the market demand for natural gas from said field for the next calendar month, or for such other period of time as the Commission shall prescribe, and at said hearing may determine any other question which may properly and legally come before the Commission for consideration thereat, and a new schedule of production allowables for the wells in said field based upon the determination made as a result of such hearing shall be prepared and promulgated for the ensuing month or period so prescribed.

11. Operators of wells and purchasers, or others taking gas from any well, shall endeavor to limit the monthly production thereof to the quantities fixed in the schedule as the allowable production for such well; provided, that, if during the period covered by any schedule there should develop a substantial increase in the amount of the market demand for gas from said field, the Director may permit production to be increased ratably from all the wells in the field to meet such emergency increased demand, and the facts respecting same shall be reported to the Commission at or before the next periodic market-demand hearing, for such action thereon as may be proper. If, at the end of any calendar month, there is an overage or underage in production for any well during such month, same shall be carried forward as a charge against or credit in favor of such well and subtracted from or added to, as the case may be, the allowable for such well for the next calendar month. Any overage in production from any well during any calendar month which is not equalized by ratable overages from all other wells in the field or which is not compensated for in the allowables fixed for other wells in the field for the next succeeding calendar month or not otherwise made up within sixty (60) days after the month in which it accrued, shall constitute illegal overproduction from such well and such well shall be shut in until such overage is thereby fully made up.

12. This order shall constitute the basic order for the proration of production in said field and shall continue in force unless and until amended, changed or modified by the further order or orders of the Commission.

13. The Commission hereby retains jurisdiction of this cause and the subject matter thereof and parties thereto, for the purpose of issuing from time to time such further orders, amendments, additional orders, rules or regulations as may be necessary in the premises.

BY THE COMMISSION, IT IS SO ORDERED.

F. QUENTIN BROWN, *Secretary.*

Before the State Corporation Commission for the State of Kansas. In the Matter of the Application of the Stanolind Oil & Gas Company, et al., for the Establishment of Spacing and Unitization for the Zenith Pool, Stafford County, Kansas. Docket No. C–93 Conservation Division

ORDER

Now on this 14th day of June 1938 the above matter comes on for consideration and decision pursuant to notice and hearing, and the Commission being fully advised in the premises finds as follows:

1. That due notice, by publication of the filing of the application herein and of the time and place of the hearing thereon and of the purposes of such hearing, has been regularly given in all respects as required by law and as ordered by the Commission, and the Commission has jurisdiction of the subject matter embraced in said application and of the parties interested therein, and jurisdiction to promulgate the hereinafter-prescribed order.

2. That there exists at this time and has existed for some time in the past, a common source of supply known and designated as the Zenith pool, located in Stafford County, State of Kansas, and covering approximately, according to information now available, the following-described area, to wit:

Sections 10, 11, 12, 13, 14, 15, 22, 23, 24, 25, 26, 27, 34, 35, and 36, all in Township 24 South, Range 11 West, containing 9,600 acres.

3. That on or about the 14th day of September 1937 the first producing oil well in the above-described area was completed in the center of the Northwest 10 acres of the Southeast quarter of Section 23, Township 24 South, Range 11 West, Stafford County, Kansas, at a total depth of 3,807 feet and is producing oil from the geological formation known as the Misener Sand; that the initial production of said well for the first 24 hours was 974 barrels; that subsequent to the completion of said first well there had been completed in said area, at the time of the filing of the application herein seven producing wells, and on said date there were seven wells drilling within said common source of supply; that the depth of said producing wells ranges from 3,801 feet to 3,821 feet and have shown an initial production for the first 24 hours of from 572 barrels to 2,400 barrels.

4. That all of the producing wells within said common source of supply are producing from what is known as the Misener Sand formation; that said producing formation is from 5 to 25 feet in thickness; that all of said wells are flowing by reason of gas pressure with the exception of one well which is being produced on the pump; and that the gas-oil ratio in said wells ranges from 200 to 1,700 cubic feet of gas per barrel of oil produced.

5. That, from the evidence with reference to said common source of supply, the depth of such producing wells which have been completed therein, the thickness, porosity, permeability, and saturation of the producing formation in said common source, the nature and character of the reservoir energy found therein, the formations encountered in the completed wells and in the wells now drilling, the cores taken from said producing formation and the history and producing characteristics of wells in other sources of supply producing from the same or similar geological formations, the Commission finds that in order to prevent and to assist in preventing underground waste, including water encroachment in the oil-bearing strata and for the preservation, maintenance, and proper use of reservoir energy for oil-producing purposes, and in order to secure a uniform taking of oil from said common source, a uniform and efficient use of reservoir energy and a uniform water encroachment in the producing structure, so that the greatest ultimate recovery of oil and gas may be produced from said common source, and in order to prevent inequitable or unfair taking from said common source of supply and prevent unreasonable discrimination therein, uniform spacing and proration units should be established within and for said common source.

6. That the drilling of more than one well on an area of 10 acres and permitting each such well to produce at the same proportionate rate as one well located on 10 acres will cause waste as defined by the laws of Kansas in that it will result in an inefficient gas-oil ratio, early water encroachment in the producing strata, water coning and fingering; will create unnecessary fire hazards; will cause an inefficient, excessive, and improper use of reservoir energy; will result in the premature abandonment of said common source of supply; and will result in a failure to obtain the greatest ultimate recovery of oil and gas therefrom.

7. That the uniform and orderly locating, spacing and operation of wells within the Zenith Pool will prevent waste, as defined by the laws of the State of Kansas, in that it will result in a more efficient gas-oil ratio, will prevent water encroachment and coning, eliminate unnecessary fire hazards, will cause a more efficient use of the reservoir energy, will prevent premature abandonment and will result in a greater ultimate recovery of oil and gas from the pool.

8. That in the event any person is the owner or any persons are the owners of a tract or area less than 10 acres, and it is necessary to drill a well on such tract in order to protect the vested rights of such person or persons, a well may be drilled on such tract upon application to the Commission and the showing that such facts exist, but in order to prevent inequitable or unfair taking from the common source of supply and prevent unreasonable discrimination therein and protect the correlative rights of adjoining owners and prevent waste, such well should only be allowed to produce oil and gas in the proportion that said area bears to a full ten acre tract.

9. In the event any person or persons having the right to drill into and produce oil from said common source of supply shall elect to develop any property on the basis of one well to a greater area than 10 acres, then and in that event, in order to prevent discrimination, protect correlative rights, and maintain orderly development, said well should be allowed to produce in the proportion that said area is greater than a ten acre area; provided, however, that no proration or spacing unit should be larger than a 20 acre area.

10. That, in order to prevent waste, prevent discrimination, protect correlative rights and maintain orderly development within the pool, each well should, as near as possible, be drilled in the center of a proration or spacing unit of not less than 10 acres, or more than 20 acres, except in the case of separately owned tracts smaller than 10 acres, and in that event the well should be as near the center of said smaller tract as practical and possible.

11. That, in order to prevent waste, protect correlative rights and maintain orderly and uniform development within said common source of supply, owners of contiguous tracts smaller than a 10-acre area shall be permitted to pool or unitize their respective separately owned tracts for the purpose of creating a drilling or spacing unit for the drilling of one well, but in no event shall such pooled or unitized area be larger than 20 acres in area.

IT IS THEREFORE, BY THE COMMISSION ORDERED:

1. That well spacing and proration units of not less than 10 acres nor more than 20 acres be and the same are hereby fixed and established for the development and production of oil from the common source of supply known as the Zenith Pool, located in Sections 10 to 15 inclusive, Sections 22 to 27 inclusive, and Sections 34 to 36 inclusive, all in Township 24 South, Range 11 West, Stafford County, Kansas.

2. That each well drilled into the said common source of supply shall be located on a well spacing or proration unit of not less than 10 acres nor more than 20 acres in area; provided, however, that upon proper showing to this Commission any owner or owners of a tract of land containing less than 10 acres in area may be permitted to drill a well upon said tract for the purpose of developing and producing oil and gas from the same or, upon proper showing to this Commission, any owner or owners of a tract of land containing less than 10 acres in area and contiguous to another tract of land containing less than 10 acres in area, but not more than a total of 20 acres for all such contiguous tracts, may, upon the unanimous consent of all owners of such adjoining tracts, be permitted to pool or unitize such separately owned tracts for the purpose of establishing well spacing or proration units for the development and production of oil and gas from said common source of supply.

3. That in the event any person or persons having the right to drill into and produce oil and gas from said common source of supply shall complete a producing well on any tract of land less than the minimum well spacing or proration unit of 10 acres, then and in that event the production from said well shall be in the proportion that the acreage on which said well is located bears to a full minimum

10-acre well spacing or proration unit. It is further ordered that if and in the event any person or persons having the right to drill into and produce oil and gas from said common source of supply shall elect to drill on and produce oil from any well spacing or proration unit larger than 10 acres in area, then and in that event said well shall be allowed to produce in the proportion that said well spacing or proration unit is larger than 10 acres in area; provided, however, that no well spacing or proration unit shall be established larger than 20 acres in area.

4. That each well drilled into the said common source of supply shall be located in the approximate center of the well spacing or proration unit hereby established, unless for good cause shown permission is granted by the Corporation Commission, after due and proper hearing, to drill at some other point on said tract.

5. Jurisdiction over this cause is hereby retained by this Commission for the purpose of changing, modifying or altering this order if at any further hearing in this cause or from any other evidence which may be adduced before the Commission it appears that such change, modification or alteration should be made.

BY THE COMMISSION IT IS SO ORDERED.

COMMISSIONER HOCH DISSENTING.

[SEAL] LEO R. PRICE, *Secretary.*

Before the State Corporation Commission of the State of Kansas. In the Matter of Establishing Rules and Regulations Relating to the Production, Sale, and Conservation of Natural Gas in the Hugoton Field, of Kearney, Finney, Grant, Haskell, Morton, Stevens, and Seward Counties, Kansas. Docket No. C-164, Conservation Division

BASIC PRORATION ORDER FOR THE HUGOTON GAS FIELD

Now on this 30th day of January 1940, the above entitled matter comes on for final consideration and determination by the Commission on the original investigation initiated upon its own motion in regard to said matter and further upon the rehearing granted therein in response to the applications of certain of the interested parties. After being fully advised in the premises, the Commission finds:

1. That due and legal notice of said hearing and of the subject matter thereof was given as required by law; that the Commission has jurisdiction of the parties hereto and of the subject matter hereof.

2. That this proceeding was originally commenced pursuant to article 7, chapter 55, General Statutes of Kansas, 1935, during the month of June 1938. After due notice a hearing was held at Hugoton, Kansas, on July 21, 1938, at which hearing the evidence tendered by interested parties was received and considered by the Commission. Subsequently a basic order was promulgated by the Commission and made effective as of September 1, 1938. The said order did, by its terms, provide for the allocation of production to the several wells located in the Hugoton field. Certain interested parties objected to the order of September 1, 1938, and requested rehearings in regard to the subject matter thereof. On September 17, 1938, an original rehearing was granted and said hearing was held on October 15, 1938, at Hugoton, Kansas, pursuant to the said order. Thereafter, on December 31, 1938, the Commission reinstated said order of September 1, 1938. On March 10, 1939, the Commission granted a second rehearing in relation to the basic order and in addition thereto instituted, on its own motion, an original investigation in regard to all the matters and things involved in the original hearing and subsequent rehearings. The second rehearing, as consolidated with the said original investigation, commenced on June 12, 1939, at Wichita, Kansas, and was concluded on June 29, 1939. Following the conclusion of said hearing, briefs were submitted to the Commission and oral arguments heard at Topeka, Kansas, on July 31, 1939. Thereafter, in compliance with the stipulation of the parties, as disclosed by the record, an ancillary order was entered on November 21, 1939, submitting the said cause for final consideration and determination.

3. That the Hugoton Field is a common source of supply of natural gas, located in Kearney, Finney, Grant, Haskell, Morton, Stevens, and Seward Counties, Kansas. The field extends south to the Kansas-Oklahoma State line and in all probability extends into the Oklahoma Panhandle. The exact boundaries of the field in Kansas are not definitely established due to the lack of sufficient development. It is indicated by present development that the Kansas portion of the field is sixty-five miles long and forty miles wide. Approximately 275 commercial gas wells have been drilled in said field and some 160,000,000,000 cubic feet of gas has been withdrawn from the common reservoir. Each and all of the wells

have a daily open-flow in excess of 750,000 cubic feet and the total combined open-flow of all the wells is approximately 1,990,842,000 cubic feet daily. The presently developed acreage held by production totals 112,353 acres as compared with an estimated proven acreage of 1,300,000 acres. Twenty-two of the wells are not connected to pipelines and are not producing, and have not produced in the past, any gas because of this fact, although some of them were drilled as long as eight years ago. The owners of the unconnected wells have, since their respective wells were completed, generally been ready and willing to make connections and sell their gas to the pipelines purchasing gas from said field; most of said owners of unconnected wells have been refused pipeline connections. The connected wells have produced and are producing large quantities of gas.

4. That the market demand for gas produced in the Hugoton field is approximately 86,000,000 cubic feet daily and it is therefore evident that the available production of the wells is in excess of the market demand for gas produced from the common source of supply notwithstanding that said wells are produced at not to exceed 25 percent of their open-flow capacities. One hundred and seventeen of the wells are located on 640-acre tracts, while one hundred fifty-seven wells were drilled on 160-acre locations. Since 1936, practically all of the drilling has occurred upon 640-acre tracts and, insofar as present and future drilling is concerned, 640 acres appears to be the standard drilling unit. Localized drilling or development has occurred in several portions of the field but it is not, however, wholly concentrated in any one particular area.

That gas is found in porous limestone and dolomite and is encountered at an average depth of from 2,700 to 2,800 feet below the surface. Impervious shale bodes are encountered within the producing horizons throughout the field, but it is evident that the gas-producing formations are interconnected and therefore constitute one common source of supply. The thickness of the gas-producing sands varies considerably, although a sand thickness of from 50 to 75 feet is representative of the geological conditions existing generally throughout the field. A fair average porosity for limestone bodies such as are encountered in the Hugoton Field is 18.2 percent. The number of gas-producing horizons, as shown by the well logs or drill cuttings, varies between wells and tracts, most of them containing from 3 to 5 gas-producing zones.

5. That the virgin reservoir pressure was 435 pounds per square inch, while at the present time shut-in well-head pressures have been observed as low as 385 pounds. Likewise variations in the pressures as between wells and leases exist throughout the field. The movement of gas within a common reservoir is governed by pressure differentials; the gas migrates from the areas of higher pressure to the areas of lower pressure. In its virgin state, the pressure within a common source of supply is the same, or practically the same, at all points. When gas is produced from a well, the pressure within the reservoir is reduced in the vicinity of the well bore. This causes gas in the formation to expand into the well. When a producing well is shut in, the pressure in the formation in the vicinity of the well will build up from that existing during production and this again tends to equalize the pressure within the formation and demonstrates that the continued migration of gas from high-pressure to low-pressure areas is occurring. Gas migrates within the reservoir from developed leases having higher pressures to other developed leases having lower pressures in accordance with the same principles which govern the movement of gas from the formation into the several well bores. If the migration or drainage of gas across property lines is not equalized by counter-drainage, the developed leases so drained will not ultimately produce approximately the amount of gas underlying them either at the time the wells were drilled thereon or at the time this order becomes effective. The extent of the movement or drainage of gas between developed leases depends upon the magnitude of variation in pressures existing as between developed leases, the areas contained in such leases, and the amounts of gas withdrawn.

That the evidence demonstrates that pressure differentials or gradients exist within the reservoir and between developed leases located sufficiently close to each other to cause drainage between such leases. The shut-in well-head pressures of some of the said unconnected wells have decreased since they were originally tested, even though the said wells have not produced any gas. Since pressure is one of the measurements of the amount of gas within the reservoir, the decreases in pressure within the reservoir under leases containing wells which have produced no gas shows that gas has been drained from such leases to or toward other developed leases having pipe-line connections in greater quantities than it has moved to said leases. Therefore, uncompensated, cognizable, and undue drainage has occurred within the common source of supply and between developed leases therein.

6. Since the Gas Conservation Act has not been construed by the courts of this State, it is necessary to make an administrative interpretation of its provisions. The intent and purpose of the statute is clear. Section 55–701 prohibits waste, while Section 55–702 defines what is meant by waste and authorizes the Commission to make rules for its prevention. While the statute contemplates future waste prevention as well as the prevention of present waste, the Commission is also authorized and directed to prorate the production of gas to prevent the inequitable or unfair taking thereof regardless of waste. This authority is found in Section 55–703. The rights of the parties owning interests in any common source of supply of natural gas are set out in the first sentence of this section. It is said:

"That whenever the available production from the wells drilled into any common source of supply of natural gas in this state is in excess of the market demand for gas from such common source of supply, any person, firm, or corporation having the right to drill into and produce natural gas (from any such common source of supply, may take therefrom only such proportion of all natural gas) that may be produced therefrom without waste as will permit each well or developed lease to ultimately produce approximately the amount of gas underlying the land or lease on which such well is located and currently produce proportionately with the other wells in such common source of supply."

The words "available production" mean gas production which is available from completed gas wells which are ready, willing and able to tender gas to some gas pipe line. The words, "and currently produce proportionately with the other wells in such common source of supply," make no distinction between connected and unconnected wells, if the owners are ready, willing, and able to tender their gas, and express emphatically the requirement that production between leases containing completed wells shall be ratable and current between such wells and leases.

The rights of the parties involved, as they are expressed in this section of the statute, have been recognized and conferred by the state in lieu of their former right to fend for themselves. Under the rule of capture, before it was modified and restricted by the enactment of this statute, property owners within a gas pool could protect themselves against drainage and the depletion of their own reserves by the acts of others by producing their wells at rates sufficient to afford such protection. However, the rule of capture accelerated production to rates in excess of the demand for lawful purposes and compelled, in many instances, well owners to blow their gas into the air, or otherwise waste it, to prevent drainage across property lines.

To prevent waste, the state has denied to any well owner the right to vent gas into the air, and in place of this right has imposed, by this statute, upon the Commission the duty and obligation of protecting a well or developed lease against the drainage and depletion of its reserves by others. Thus, under a modified rule of capture, the state has recognized the doctrine of *sic utere tuo ut alienum non laedas*, which, in fact, is the doctrine of correlative rights. It conforms more closely to the physical facts relating to the production of oil or gas from a common source of supply than the out-moded rule of capture. Ironically, Great Britain, which bequeathed to us the doctrine of *Acton* v. *Blundell*, very promptly legislated herself out of subservience to the rule of capture when petroleum development was projected for the British Isles; but until recent times we have preserved the learning of the ancients to the neglect of the potentialities of our own times.

The requirement that each well or developed lease shall produce currently and proportionately with the other wells and leases, expressly authorizes the Commission to prevent undue drainage between such developed leases. The same idea is also presented by the words "to prevent the inequitable or unfair taking", and, "to prevent unreasonable discrimination in favor of any producer." Nowhere in the statute providing for ratable taking, the protection of correlative rights, and the prevention of undue drainage, is there any requirement that such regulation must be imposed only for the prevention of waste. The phrase, "that may be produced therefrom without waste as will permit each well or developed lease * * *", obviously means that gas shall not be produced in such quantities as will cause waste even though the gas is produced ratably and without undue drainage. Thus, in no case shall waste be permitted but ratable taking or production shall be required in any case whether there is waste or no waste.

The words contained in the quotation from Section 55–703 which appear in parentheses were supplied by the Commission because they were inadvertently omitted from the statute. The spirit, the purpose, and the intent of the sentence, standing alone and without these words, are obvious; and, when this section is considered with the act as a whole, the meaning of the whole is even more evident. The journals of the legislature of 1935, which enacted this law and which are deposited in the State Library, show that the act originated in the House of Representatives as House Bill No. 279; that as originally introduced, the above words contained in parentheses were in it and remained there after the bill was approved by the House as a committee of the whole, but that in engrossing the House Bill for the third and final reading thereof the printer omitted the words inadvertently. The bill with the words omitted by the printer was passed by both the House and the Senate, and signed by the Governor. The same act, word for word, was passed by both houses of the legislature and signed by the Governor of the state and it has therefore been duly enacted into law.

It is the general rule, and also the rule in Kansas, that words inadvertently omitted from a statute which has passed both houses of the legislature, may be supplied by the courts to give effect to legislative policy. In this case the omission is obvious, the identical words which were omitted can be supplied from the journals of the legislature and the meaning and the intent of the statute are clear with the words in parentheses omitted. Our Supreme Court has held in *Landrum* v. *Flanagan*, 60 Kansas 436, *Cole* v. *Dorr*, 80 Kansas 251, *Young* v. *Regents*, 87 Kansas 239, *State* v. *Taylor*, 90 Kansas 438, and *State* v. *Horn*, 126 Kansas 591, that such obvious omissions can be supplied. The same court has also held that the journals of the legislature may be examined to determine the history of legislation, the validity of an act and the amendments thereto.

It has been argued that the Commission should not attempt to enforce the statute at this time because the field is so large that the tremendous amount of gas already produced represents a very small portion of the ultimately recoverable reserves. If the Commission should accept this view, it would be required to wait until it is too late to make any effective regulations. It is also argued that the statute should be interpreted to protect leases which have no wells on them at the present time; but if this should be the construction adopted, then it would be impossible to produce any gas in the field until every tract contained a well.

Therefore, we are compelled to conclude that the statute is mandatory and not only authorizes but directs the Commission to prevent waste in any common source of supply of natural gas and independently of waste to establish ratable production therefrom so that undue drainage between developed leases can be prevented and correlative rights therein protected.

7. That there exists disproportionate production from the wells and leases in the said field, and, in order to protect the rights of all parties concerned, it is necessary for the Commission to take jurisdiction and to prescribe regulations for the production of gas from said wells and others that may be hereafter completed in said field to the end that each person, firm, or corporation having the right to drill into and produce natural gas in said field may take therefrom only such proportion of the amount that may be produced therefrom without waste as will permit each well or developed lease to produce ultimately at least approximately the amount of gas underlying the land or lease on which such well is located and currently produce proportionately with the other wells in said field. That the said disproportionate production which has occurred and is occurring has caused undue, cognizable, preventable, and noncompensated drainage of gas from developed properties, tracts, and leases to other developed properties, tracts, and leases in and throughout said field; that various developed properties have suffered undue, premature, and inequitable depletion by reason of such conditions and practices as is evidenced by the differences in the shut-in well-head pressures of the various wells throughout the field. The wells which have produced the greater amounts of gas generally show the lower pressures, while the wells which have had smaller withdrawals generally show the higher pressures. Wherever this is not true, the fact that wells which have produced considerable quantities of gas have not suffered material decreases in pressure indicates that they have probably drained adjoining leases to a greater extent than the wells which show pressure declines. The present and past production from the wells in said field is and has been inequitable and unfair and has caused unreasonable discrimination against various developed properties, denying to many owners of developed properties the opportunity to produce currently and proportionately with the owners of other wells in said field, and denying to many owners of developed properties the opportunity to ultimately produce at least approximately the amount of gas underlying their developed tracts.

8. That one well completed into said formation can adequately and sufficiently drain 640 acres without causing waste; but there are a number of wells which have

been drilled on 160 acre tracts; that considering the cost of drilling, equipping, and operating one well in comparison with the estimated recovery per acre and the slow rate at which the production from this field can be ratably and nonwastefully marketed, the Commission finds that the basic acreage unit to be used in the proration formula hereinafter prescribed should be 160 acres, and said factor shall be increased or decreased by 5 percent for each ten acres greater or less than 160 acres, as the case may be, but in no instance shall more than 640 acres be considered to be attributable to a well for the purpose of calculating the said acreage factor. To be considered as attributable to a well, the acreage should be contiguous to and adjoin with the tract which contains the well and must be approximately square or rectangular in shape with the well located as near as practicable to the center thereof. However, leases or tracts which have already been unitized in compliance with provisions of the basic proration order effective September 1, 1938, should be deemed to comply with the provisions of this order in regard to contiguous acreage or acreage properly attributable to a well, but all further unitization should be in conformance with the provisions hereof. In the event more than one well is located on any one lease, the acreage to be used in calculating the acreage factor of each well on such lease shall be determined by dividing the total number of acres by the number of wells and the quotient thereof shall be the acreage used in making the said calculation.

That the producers in the field have been required by custom to lay gathering lines from their wells to the pipe lines of the purchasers. A lease is therefore not developed until a gas producing well has been completed thereon and the owner or operator thereof has tendered gas to a purchaser at the purchaser's pipe line. Before a well is entitled to an allowable, the owner or operator thereof should either tender the gas to a pipeline company or others who are purchasing in the zone in which such well is located, or demonstrate that he will and can produce the gas allowed such well for lawful purposes. Such tendership may be shown by constructing a line from the well to such pipe line or other purchasing facilities or by filing with the Director of the Conservation Division an affidavit setting forth that the said producer is ready, willing, and able to construct said line from the well to the facilities of the purchaser, but that the purchaser refuses to buy the gas when so tendered.

9. That on account of the size of the common source of supply and in order to enable the purchasers of the gas produced therefrom to more readily adjust their purchases to the allocation of allowed production to the wells made hereunder, the field should be zoned in accordance with the development of production and the location of pipe lines. That such zoning is feasible at the present time because of the distances between the areas of development and the location of the purchaser's facilities in that the migration or movement of gas between zones or between developed leases in one zone to developed leases in another or other zones would not be undue or excessive, unless production did not occur in compliance with the formulas hereinafter prescribed. However, if the said zoning of the field should hereafter be judicially determined to be invalid, then all of the wells and tracts therein should produce in accordance with the provisions of the said formula hereinafter adopted, the same as if no zones had been prescribed and as a unit. That the areas of development and the location of pipe lines for purchasing and gathering facilities are such that the said field should be zoned, as above indicated, and as follows:

Zone No. 1 should contain all of that portion of Stevens and Morton counties located within the common source of supply and lying south and west of the following described line: Commencing at the northeast corner of Morton county on the county line common to Stanton and Morton counties or as far west thereof as the future western boundary of said field shall be found to be located, thence east 7 miles, thence south 3 miles, thence east 3 miles, thence south 4 miles, thence east 3 miles, thence south 5 miles, thence east 5 miles, thence south to the Kansas-Oklahoma state line and thence west on the Kansas-Oklahoma state line to the western boundary of said field.

Zone No. 2 should contain all that part of Stevens and Seward counties located within the said common source of supply lying south and east of the following described line: Commencing at the northeast corner of township 33, range 33, Seward county, Kansas, thence west 21 miles, thence south to the Kansas-Oklahoma state line thence east on the Kansas-Oklahoma state line to the eastern boundary of said field.

Zone No. 3 should include all that portion of the common source of supply lying north of the township line common to townships 27 and 28 in Grant and Haskell counties.

Zone No. 4 should include all that portion of the common source of supply lying north and east of Zones 1 and 2 and south of Zone 3, except that portion of Haskell and Seward counties which lies east of the following described line: Commencing at the northwest corner of township 28, range 33, Haskell County, Kansas, thence south 18 miles to the Haskell-Seward county line, thence east 1 mile, thence south 12 miles to the northern boundary of Zone No. 2.

Zone No. 5 should include all that portion of the field lying east of Zone No. 4, south of Zone No. 3 and north of Zone No. 2, which is described as follows: Commencing at the eastern border of said field on the south boundary of Zone No. 3, thence west to the northwest corner of township 28, range 33, Haskell county, thence south 18 miles, thence east 1 mile, thence south 12 miles, thence east on the boundary line of Zone No. 2 to the edge of the field.

10. That the number of acres of a developed gas lease, herein called "acreage", is one of the most important factors in estimating or computing the gas reserves under the land covered by the lease and that to enable each developed lease to produce its share of the gas in the pool or zone, the acreage factor must be considered and duly weighed; that the pressure factor is of importance in the prevention of drainage, not equalized by counter-drainage, from developed property to developed property and so as to permit the owners of developed tracts to ultimately produce approximately the amount of gas which underlies the tracts; that by the use of the well pressure factor, correction can be made from time to time in the allocation of allowed current production in order to prevent or diminish such drainage. That relative open-flow capacities of the various wells is of importance in determining the respective productivities of the various developed tracts in that it is indicative of the relative porosity, permeability, and productive thickness of the formation where the various wells are located. It is not given the weight or importance in the formula that acreage and pressure are given for the reason that open-flow may be affected by completion methods and the acidization of the producing formation, which does not in itself affect the amount of gas which underlies the developed tract. In order to avoid giving undue weight to open-flow potentials and thus unduly favoring high potentials and penalizing wells with low potentials, the open-flow factor should be minimized as is hereinafter indicated.

11. That for the purpose of permitting the owners of each well and developed tract to ultimately produce approximately the amount of gas underlying the land on which such well is located as of April 1, 1940, and to currently produce proportionately with other wells in the common source of supply and to carry out the duties imposed by law, it is reasonable and necessary to regulate the production of natural gas in the Hugoton Field and to provide for the ratable and equitable taking thereof. The total volume of gas to be produced from each zone, as hereinabove described, and according to the current market demands for lawful purposes for each such zone respectively, should be distributed and allocated among the various wells within each respective zone; that such distribution and allocation within each zone can reasonably be accomplished by applying the following formula, to wit: Four-fifths of the allocation to the product of the acreage factor as determined in paragraph number 8 by the observed pressure within the well, and one-fifth of the allocation to the open-flow potential of the well. In other words, four-fifths of the allocation of production to satisfy the respective market demand of each zone should be allocated to each well therein in the proportion as the product of its acreage factor times pressure bears to the sum of those products for all the wells in said zone, and one-fifth of the allocation of production to satisfy the market demand for each said zone should be allocated to each well in the proportion that the open-flow of each well bears to the sum of the open-flows of all the wells in said zone; provided, that, if the said zoning is judicially determined to be invalid, all the wells in said pool should thereafter produce in accordance with the said formula the same as if the field had never been zoned. Each well shall be entitled to produce during each respective proration period the amount of production allocated to it under the said formula.

That the production of gas in accordance with the foregoing formula has a reasonable relation to prevention of waste and to the prevention of inequitable and unfair production of gas from the common source of supply, and to the prevention of unreasonable discrimination in favor of one producer in said field and against another producer therein and that production of gas in such manner will in fact accomplish the purposes for which article 7, chapter 55, General Statutes of Kansas, 1935, was enacted.

12. That this order should constitute the basic order for the proration of production in said field and should continue in force unless and until amended, changed, or modified by the further order or orders of the Commission. There should be established two allowable periods for each year. The first period shall extend from April 1 to September 30, both inclusive; and the second period shall extend from October 1 to March 31, both inclusive. Such allowable or proration periods are established for the purpose of facilitating the administration of the Gas Conservation Act and to make it easier for the purchasers to adjust their takes over long periods rather than over relatively short periods and so that one report and order should cover the spring and summer months of the year and the other the fall and winter months, thus dividing the periods of high demand from those of lower demand.

At such times and places as the Commission shall fix, the Commission will, after notice, conduct a hearing to determine the market demand for natural gas from said field and from each of the respective zones therein for the next succeeding proration period, or for such other period of time as the Commission shall prescribe, and at said hearing may determine such other questions as may properly and legally come before the Commission for consideration thereat, and a new schedule of production allowables for the wells in said field based upon the determination made as a result of such hearing shall be prepared and promulgated for the ensuing proration period. Overages will be required to be made up and shortages may be produced in accordance with the provisions of and the allocations made by the periodic schedules and reports.

Operators of wells and purchasers or others taking gas shall endeavor to limit the production thereof to the quantities fixed in the schedule as the allowable production for such wells; provided, that, if, during the period covered by any schedule there should develop a substantial increase in the amount of the market demand for gas from said field, or any respective zone thereof, production may be increased ratably from all the wells in the field or from all the wells within one or more zones to meet such emergency increased demand, and the facts respecting the same shall be reported to the Commission at or before the next periodic market demand hearing for such action thereon as may be proper.

13. Open-flow capacities and 72-hour shut-in pressures of the wells in said field shall be taken by or under the supervision of the gas engineer of the Conservation Division of the Commission, with the aid of the owner of the well. Such tests to be taken prior to April 1, 1940, and each year thereafter, and in such manner as will accurately reflect the ability of the well to produce. Prior to testing any well, reasonable notice shall be given to owners of offset wells stating the time at which such test will be commenced. A written report thereof, signed by the persons taking and witnessing the same, and approved by the Director or his agents who took or supervised the same, shall be made and filed with the Director of the Conservation Division, forms for which shall be furnished by the Director. The acreage of each well shall be certified in writing by the owner of the well and filed with the Director. If the acreage assigned to any well should be increased or decreased at any time after the initial report thereon is made, such facts shall be promptly certified by the owner to the Director. Any operator in the field shall have the right to challenge the correctness of the acreage assigned to any well.

As new wells are brought in, their respective open-flow capacities, pressures, and acreage shall be taken, reported, and certified in like manner.

Once each year tests of the open-flow capacities in the manner aforesaid and the 72-hour shut-in pressures of all the wells in said field shall be made at approximately the same time.

The Director of the Conservation Division shall prepare production schedules in accordance with the provisions of this order for the wells in said field and each zone thereof and submit same to the Commission for approval, and upon the approval thereof said schedule will take effect and be promulgated, and the Director shall promptly furnish to each producer and purchaser in said field a copy thereof with a copy of this order, and they shall govern themselves accordingly in the subsequent operation of said wells.

All wells shall be equipped with meters and the amount of gas produced from each well should be accurately measured; provided that where more than one well is situated on a lease, a meter for each well is not required if upon application and proper showing the Commission finds that all the gas produced from the wells may be accurately measured so as to determine whether production is ratable and without unreasonable discrimination.

14. That this order should become effective on and after February 1, 1940, and the first proration schedule and report thereunder should become effective on and after April 1, 1940. The former orders of the Commission, entered in regard to this same matter, should be modified and amended in compliance herewith.

The Commission should retain jurisdiction of this cause and of the subject matter thereof and the parties thereto for the purpose of issuing from time to time such further orders, amendments, additional orders, rules, or regulations as may be necessary in the premises.

IT IS, THEREFORE, BY THE COMMISSION ORDERED: That the production of natural gas in the Hugoton Gas Field be, and the same is hereby, regulated and restricted in conformance with the findings hereinabove made and in compliance with the formula, zoning, and other matters therein contained.

The Commission hereby retains jurisdiction of the subject matter hereof and the parties hereto for the purpose of issuing from time to time such further orders, amendments, additional orders, rules, or regulations as may be necessary in the premises.

BY THE COMMISSION IT IS SO ORDERED.

[SEAL] F. QUENTIN BROWN, *Secretary*

Before the State Corporation Commission of the State of Kansas. In the Matter of Fixing Gas Allowables for the Gas Wells Located in the Lyons Gas Field, Rice County, Kansas. Docket No. C–261, Conservation Division

ORDER

Now on this 9th day of March, 1939, the above entitled matter comes on for consideration and determination by the Commission after rehearing and, after being fully advised in the premises the Commission Finds:

That the Order heretofore promulgated and made effective as of January 1, 1939, should be amended and modified as hereinafter set forth.

That part of the said Order which establishes a formula to be used by the Commission in the allocation of production to the various wells located in the Lyons Pool should be amended to read as follows: 62½% of the allocation to the product of the acreage containing the well by the observed pressure within the well, and 37½% of the allocation to the open-flow potential of the well. In other words, 62½% of the total market demand for natural gas from the Lyons Field should be allocated to each well in the proportion as the product of the acreage times pressure for each well bears to the sum of those products for all the wells in the field, and 37½% of the total market demand should be allocated to each well in the proportion as the open-flow gas potential of each well bears to the sum of the open-flow gas potentials of all the wells in the field.

That portion of the said Order effective as of January 1, 1939, which establishes an acreage factor to be used in the said formula should be amended to read as follows:

The acreage to be used in the said formula shall be contiguous with that which contains the well and shall be determined by the number of acres in the leased tract on which the well is situated, provided: that no well shall be allocated an acreage factor which exceeds the proven acreage properly attributable to said well.

That the foregoing amendments to the said Order will more reasonably permit each and all of the gas wells located in the Lyons field as well as developed leases therein, to currently produce proportionately with other developed leases in such common source of supply, and will more reasonably enable each of such wells to ultimately produce approximately the amount of gas underlying the land or lease upon which such well is located than said order as originally entered. That this Order should become effective as of March 1, 1939, at 7 o'clock a. m.

IT IS, THEREFORE, BY THE COMMISSION ORDERED: That the Order issued in the above matter, and effective as of January 1, 1939, be and the same is hereby amended to conform with the findings set out above, provided, however, that the terms and provisions of said Order not in conflict herewith shall remain in full force and effect.

IT IS FURTHER ORDERED: That this Order shall become and is hereby made effective as of March 1 1939, at 7 o'clock a. m.

BY THE COMMISSION: IT IS SO ORDERED.

LEO R. PRICE, *Secretary.*

GENERAL RULES AND REGULATIONS FOR THE CONSERVATION OF CRUDE OIL AND NATURAL GAS AND FOR THE PROTECTION OF FRESH WATER AND FRESH WATER STRATA

Prescribed by the Corporation Commission of the State of Kansas, Effective December 1, 1939

OIL CONSERVATION RULES

RULE 100. GENERAL AND SPECIAL RULES AND REGULATIONS

GENERAL RULES, REGULATIONS, AND ORDERS shall be statewide in application unless otherwise specifically stated.

SPECIAL RULES, REGULATIONS AND ORDERS will be issued when required, and shall prevail as against GENERAL RULES, REGULATIONS AND ORDERS if in conflict therewith.

RULE 101. DEFINITIONS

The following terms used herein are defined as follows:

Allowable shall mean the amount of oil authorized to be produced by order of the Commission.

Allowable period shall mean the time in which allowable may be produced.

Assessment shall mean any charge against the parties involved in any hearing, application, investigation, or the enforcement of an order, and the assessment on each barrel of oil produced, to pay the costs incident to the administration of the oil conservation act.

Average well size of a pool shall mean the average well productivity thereof as determined in Rule 109A.

Casing-head gas shall mean gas produced with oil from a stratum containing both oil and gas.

Combination well shall mean a well productive of both oil and gas in commercial quantities from the same common source of supply and which has sufficient natural pressure to cause gas to enter a pipe line carrying more than atmospheric pressure.

Commission shall mean the State Corporation Commission.

Common source of supply shall mean each geographic area or horizon definitely separated from any other such area or horizon and which contains, or from competent evidence appears to contain a common accumulation of oil or gas or both.

Conservation division shall mean the department of the Commission in charge of the administration of the oil and gas conservation acts, and the well plugging, salt water disposal, and repressuring and flooding acts under the direction, supervision, and control of the Commission.

Correlative rights shall mean that each owner or producer in a common source of supply is privileged to produce therefrom only in such manner or amount as not to injure the reservoir to the detriment of others or to take an undue proportion of the oil or gas obtainable therefrom, or to cause undue drainage between developed leases.

Day shall mean a period of twenty-four (24) consecutive hours.

Director shall mean the person in official charge of the conservation division.

Division Order shall mean a written statement, dated, duly signed by the owners and delivered to the purchaser, certifying and guaranteeing the interests of ownership of the production, and directing payments according to those interests.

Field shall mean a geographic area containing one or more pools.

Gas-Oil ratio shall mean the relation of the gas in cubic feet to oil in barrels in the production of a well.

Illegal production shall mean any production in violation of the Statutes and/or the Rules, Regulations and/or Orders of the Commission.

Minimum pool shall mean every oil-producing pool located in this state which has an average well size of less than fifteen barrels per day.

Minimum well shall mean any well which has a potential of fifteen barrels or less.

Mud-laden fluid shall mean any approved mixture of water and clay or other material as the term is commonly used in the industry which will effectively seal the formation to which it is applied.

Oil shall mean crude oil or petroleum.

Oil, pipe line oil shall mean oil free from water and basic sediment to the degree that it is acceptable for pipe-line transportation and refinery use.

Oil well shall mean any well capable of producing oil in commercial quantities, and not producing gas in commercial quantities from the same common source of supply.

Operator shall mean any person who, duly authorized is in charge of the development of a lease, or the operation of a producing well.

Overage or overproduction shall mean the oil or gas produced in excess of the allowable.

Person as herein used shall mean any natural person, corporation, association, partnership, receiver, trustee, guardian, executor, administrator and/or a fiduciary of any kind.

Oil Pipe Line shall mean any pipes above or below the ground used or to be used for the transportation of oil.

Pipe Line Oil: See Oil, Pipe Line.

Pool shall mean the common source of supply as officially named.

Potential shall mean the properly computed daily ability of a well to produce oil without underground waste, as determined by the Rules and Regulations of the Commission.

Potential period shall mean a period of time for which a potential shall be used in any pool until another potential is determined and applied.

Potential time shall mean the time allotted for the duration of a potential test.

Producer shall mean any person who owns, in whole or in part, a well capable of producing oil or gas or both in commercial quantities.

Production shall mean produced oil, gas, distillate or casing-head gas.

Production, illegal: See Illegal Production.

Production interest shall mean the right to a specified part of production.

Productivity of a well shall be the product obtained after increasing or decreasing the potential by 10 percent for each acre greater or less than 10 acres, as the case may be, so that the productivity shall be revised upward or downward in direct proportion that the area of the unit bears to 10 acres; Provided, that in no instance shall the productivity of a well be greater than twice its potential, except as applied in pools for which the Commission has established an acreage factor greater than 20 but not more than 40 acres.

Productivity of a pool shall be the sum of the productivities of the wells located therein; Provided, that no well shall be assigned a productivity greater than twice its potential, when such productivity is being used to determine the average well productivity of the pool.

Proration shall mean the regulation of the amount of allowed production for the purpose or purposes of preventing waste, undue drainage between developed leases, unratable taking or unreasonable discrimination as between operators, producers, and royalty owners, within a common source of supply, or unreasonable discrimination in favor of any one pool as against any other pool in this state.

Proven oil or gas land shall mean that area which has been shown by development and geological information to be such that additional wells drilled thereon are reasonably certain to be commercially productive of oil or gas or both.

Purchaser shall mean any person who directly or indirectly purchases, transports, takes, or otherwise removes production to his account from a well, lease, or common source of supply. Purchaser is usually considered to be the person holding the Division Order.

Shortage shall mean the amount by which the oil legally produced and sold or removed from the premises is less than the allowable.

Storage Oil—shall mean produced oil confined in tanks, reservoirs, or containers.

Storage oil—lease—shall mean produced oil in tanks, reservoirs, or containers on the lease where it was produced.

Taker: See Purchaser.

Tendership shall mean the production delivered from one person to another, usually from one pipe line company to another.

Undue Drainage shall mean the uncompensated migration of either oil or gas between developed leases within the same common source of supply, which migration is caused by the unratable production of some well or wells located therein.

Waste. See 1939 Supplement of Kansas, Section 55-602.

Waste Oil shall mean any tank, bottom, basic sediment, cut oil, reclaimed oil from pits, ponds, or streams, dead oil, emulsions, or any other types of oil not defined as pipe-line oil.

Well Log shall mean the written record progressively describing the strata, water, oil, or gas encountered in drilling a well with such additional information as to gas volumes, pressures, rate of fillup, water depths, caving strata, casing record, etc., as is usually recorded in the normal procedure of drilling.

Well Plugging. See Rules and Regulations under Well Plugging Act.

RULE 102. WASTE PROHIBITED

The production of crude oil in such manner and under such conditions as may cause waste is prohibited. That the term "waste" as used herein, in addition to its ordinary meaning, shall include economic waste, underground waste, surface waste, waste of reservoir energy, and the production of crude oil or petroleum in excess of transportation or marketing facilities or reasonable market demands.

RULE 103. PREVENTION OF WASTE: PROTECTION OF CORRELATIVE RIGHTS: AND PREVENTION OF DISCRIMINATION BETWEEN POOLS

Whenever the full production from any common source of supply, herein called "pool", of crude oil in this state can only be obtained under conditions (a) constituting waste, as defined in Section 1, Chapter 227, Laws of 1939, or (b) independently of waster under conditions injurious to the respective correlative rights of the producers therein, and/or causes undue drainage between developed leases therein, or (c) under conditions unreasonably discriminating against other pools in the state, then any person having the right to drill into and produce oil therefrom may take therefrom currently no more than that proportion of all crude oil which may be produced therefrom, currently without waste, or without such injury, or without such discrimination, which the productivity of his well or wells bears to the productivity of all the wells therein.

RULE 104. CLASSIFICATION OF WELLS: DETERMINING AND NAMING COMMON SOURCES OF SUPPLY: NOMENCLATURE COMMITTEE

Wells shall be classified as to the common sources of supply from which they produce. Common sources of supply shall be determined and named by the director after considering the recommendations of the Nomenclature Committee of the Kansas Geological Society and the Advisory Committee appointed by the Governor; Provided, That in the event any person is dissatisfied with any such classification or determination an application may be made to the Commission for such classification or determination as the applicant deems proper, and the Commission will hear and determine the same.

In the naming of common sources of supply, preference shall be given to common usage and geographic names. Separate common sources of supply within the same field shall preferably be named according to the producing formation.

RULE 105. POTENTIALS—METHODS OF TAKING

The potential of all wells in the several prorated pools in this state, shall be taken in accordance with the following rules:

A. Type of Test.—Potentials shall be determined by a physical test or by the draw-down method in accordance with these rules at the option of the operator or producer; provided, that the Director may require a physical test when said draw-down method is chosen, if in his opinion such method will not reasonably reflect the capacity of the well tested to produce oil.

B. Maximum Potential.—No well shall be assigned a potential as a result of a draw-down test in excess of three thousand barrels per day, and if such well is making water the three thousand barrel maximum shall apply to the total liquid produced, both oil and water, so that the maximum potential assigned to any such well shall be three thousand barrels per day less the percentage of water.

No well shall be assigned a productivity greater than twice its potential, except that the wells located in pools for which the Commission has established an acreage factor greater than 20 but not more than 40 acres, may receive productivities for the purpose of allocating production between the wells within pools only, equal to the product obtained by increasing or decreasing their respective potentials by 10 percent for each acre attributable to each well, greater or less than 10 acres as the case may be so that the productivity shall be revised upward or downward in direct proportion that the area of the unit bears to 10 acres, so long as such acreage does not exceed the acreage factor so fixed.

C. Supervision.—All tests, regardless of method used, must be taken under the supervision of the Commission.

D. Information.—The director, or the representative of the Commission acting under the director, shall have free access to all tanks, pipe lines, pumps, and other equipment, on request, and the operator shall, on request, furnish the director with a map showing the location of all pipe lines, valves, cut-offs, and other facilities used on the lease in the production and transportation of oil, or other fluids and such other information as may be required.

E. Tanks Gauged.—All tanks to be used in the taking of tests must be gauged for oil and thiefed for water at the beginning and end of the test, and all such tanks, and gun barrels, through which the production flows, must be equipped for safe and accessible gauging.

F. Measurement of Water Produced.—The volume of water shall be ascertained in all tests, by thiefing, metering, or by some other approved method, and the volume of water not separated from the oil shall be determined by centrifuging composite samples taken from the flow tanks and stock tanks at the end of the test.

G. Physical Tests.—When a physical test is used as the standard for determining the ability of any well to produce, such physical test shall be taken of such wells in the manner in which they are normally produced, namely, flowing wells by natural flow through not to exceed 3″ tubing with perforations at the producing horizon, and pumping wells by pumping with reciprocating pumps, using not to exceed 3-inch working barrel, and not to exceed a 54-inch pumping stroke, and producing through not to exceed a 3-inch tubing, or producing through the casing without the use of tubing, but with the same restrictions as to working barrel and stroke; provided, that casing pumps shall not be used during the taking of a physical test on wells which produce by both flowing and pumping unless the Director shall determine that the use of the same will not affect the accuracy of said test.

At the start of a physical test there shall be removed from the well being tested a volume of liquid approximating the volume of liquid in the annular space as determined by the Director of Conservation or his agents. Immediately after such volume of liquid has been removed and gauged the well shall be produced for a period of eight consecutive hours, and the total liquid obtained during such period shall be multiplied by three (3) and reduced by percentage of water, to determine the potential of such well. The production rate for the entire physical test shall be approximately the same. No allowance for down-time during the test period will be granted except when a well is shut down at the direction of the supervising agent.

Whenever the operator of a well upon which a physical test is being taken is dissatisfied with the results of the 8-hour test, he may continue to produce said well for an additional 16 hours and the amount of oil produced in said 24-hour period shall equal the potential of such well.

H. Draw-Down Method.—The procedure for the determination of potentials on pumping or flowing wells by the draw-down method shall be obtained by the use of an approved liquid level measurement device, (echometer, depthograph or bottom hole pressure gauge) as follows: Three liquid level points or pressure measurements shall be established in each case after the well has reached equilibrium. Equilibrium shall be considered to have been reached when the variation in the average liquid level does not exceed five (5) feet per hour or pressure variation of five (5) pounds per hour when bottom-hole-pressure-gauge is used. The pumping speeds or flowing rates shall be at production rates sufficient to establish definite points for the extrapolation of a draw-down curve, and shall be at least at rates of approximately fifteen (15), ten (10), and five (5) barrels of liquid per hour consecutively provided that no well be required at its high rate of production to produce in excess of 50% of its liquid capacity. The difference between the production rates shall be proportional as nearly as possible. Production gauges for each liquid level determination shall be taken for at least three (3) hours for each production rate point after equilibrium has been reached.

On all pumping wells the initial draw-down test shall have the tubing perforations at approximately the top of the producing formation. On subsequent tests each well shall be tubed to a depth sufficient for establishment of such stabilized production rates as are necessary. Each such well shall be so tubed and produced for such a length of time prior to testing that equilibrium of the liquid in the annular space will be established.

The draw-down curve shall be a straight line plotted through the lowest production rate point and a point which is the average of the two higher points established by the test. If the difference between the indices of the potential as determined for the lowest and intermediate, and the lowest and highest stabilized points divided by the largest index of the two indices exceeds ten (10) percent such indices of the potential shall be redetermined. The values shall be extrapolated to indicate the potential of the well at the top of the producing horizon, that is the rate at which the well could produce if tubed to bottom and pumped off if such indicated potential is less than the maximum permissible potential as hereinbefore provided for. If such potential is greater, the values shall not be extrapolated beyond the maximum permissible potential. Such determination shall be carried out in full agreement and accord with accepted engineering principles and practices.

Any operator of any approved liquid level measuring device or bottom hole pressure gauge for determining potential indices shall be a trained technician, fully qualified and competent to accurately and efficiently operate said apparatus. The tests shall be carried out under the direction and supervision of a qualified and competent engineer of the Commission.

The Director shall specify the type of approved liquid level or bottom hole pressure gauge to be used in each draw-down test. The operator of the device so specified shall be employed by the Commission and responsible to it as well as under the direction and supervision of the engineer of the Commission supervising such test.

The Commission shall assess the producers whose wells have been tested amounts sufficient to defray the actual expenses incurred in the taking of such tests.

I. Notice and Witnesses.—The producer of a well on which a test is to be taken shall notify the producers of the offset producing leases at least twelve (12) hours prior to the time when said test shall commence, and representatives of any lease in the field may witness the gauges and records during such tests.

The offset wells shall not be produced during the test period unless permitted by the Director or his agents.

J. Costs for Additional Tests.—Whenever a physical test is delayed or not completed as scheduled, thereby causing loss of time to supervising agents, an assessment of $10.00 shall be made for each additional supervised test until the same is completed.

K. Temporary Potentials.—Temporary well potentials may be taken prior to the installation of permanent equipment. When the permanent equipment is installed another test may be taken. Such permanent equipment test if taken shall be taken within a period of forty-five (45) days from the date of such temporary potential unless the operator or producer satisfies the Director that said permanent equipment test was further delayed for causes and reasons over which he had no control.

L. Swabbing.—Swabbing is prohibited in the taking of a test except for a temporary potential which shall be effective for not more than thirty days. Such temporary potential shall be established at 75 percent of the result of the swabbing operations.

M. Production considered.—Only pipe-line oil produced during the test will be considered in determining potentials.

RULE 106. POTENTIALS—WHEN TO BE TAKEN

A. New wells.—No well shall be given an allowable until a potential test is taken as provided by the Rules and Orders of the Commission.

B. Pool tests.—Pool tests shall be taken as ordered by the Commission and at 12 month intervals thereafter. A well tested less than three months prior to the date a scheduled pool test is to be made effective shall not be required to take such pool test but shall thereafter be scheduled with the pool for testing. Operators or producers shall be notified ten (10) days prior to the starting of a pool test.

C. Change in method of production.—Whenever a well changes its method of production, as from flowing to pumping, a new potential test shall be taken, the same as for a new well, and producers shall notify the Director immediately in writing of such change, and no allowable shall be granted until new potential is determined.

D. Change in common source of supply.—Whenever the production of a well is changed from one common source of supply to another, a new potential test shall be taken, the same as for a new well, and producers shall notify the Director immediately in writing of such change and no allowable shall be granted until new potential is determined.

E. When good cause shown.—The Commission may on its own motion or on the application of any person in interest, for good cause shown, direct the taking of a potential test of any well or any pool.

F. Potential adjustments.—Whenever a well or lease has failed for two successive months to produce its allowable without good reason shown, its potential shall be fixed at 125 percent of the average daily production for said two months.

G. Unofficial potential test.—The results of all unofficial potential tests taken on wells in prorated pools by the owner or operator thereof shall be reported to the Commission on verified forms provided therefor. Such information shall not become a part of the public records of the Commission but shall be considered as confidential and shall only be used to determine whether new potentials should be taken on the wells or pools involved.

The term "unofficial potential test" shall mean any test, not conducted under the supervision of the Commission or one of its employees, which has for its purpose the determination of the ability of such well to produce oil.

RULE 107. OTHER METHODS FOR TAKING POTENTIALS—PROCEDURE

A. Application, contents and notice.—Whenever the operators or producers owning or controlling a majority of the wells in any common source of supply desire that some other method than those provided by these rules be used in determining the ability of the wells in such pool to produce, they shall file an application with the secretary of the Commission, in triplicate, setting forth (1) the name of the pool and its location, (2) the names of the producers, and the number of wells owned or operated by each in such pool, (3) the method or standard which such producers desire to be used, and (4) there shall be attached to such application and made a part thereof an affidavit by two competent persons to the effect that they have investigated the method or standard desired to be used and setting forth the nature of such investigation, and their reasons for believing that such method or standard as applied to such pool will truly reflect the ability of the wells therein to produce. It shall also have attached thereto an affidavit stating that a copy of the application has been delivered or mailed to each producer in that affected pool.

This rule shall not be construed to authorize the granting of minimum or maximum allowables in excess of 15 barrels daily in lieu of the taking of potential tests. Such allowables do not reflect and are not indicative of the ability of wells to produce oil and are not potentials as herein defined.

B. Answer, contents, and notice.—In the event any producer desires to resist such application, he shall within ten days from the date of the filing thereof, file his answer, in triplicate, setting forth his objection, and he may as a part of such answer propose a different method or standard than that set out in the application or in these rules, in which event the same procedure shall be followed as provided for the filing of an application. Upon the filing of an answer, it shall be the duty of the secretary of the Commission to set the case for hearing at a date certain and notify all persons interested of the date and place of such hearing. *Provided*, That if no objection is filed or issue raised by any answer, the Commission may grant the application without formal hearing.

C. Hearing.—The Commission shall, on the date and place fixed in the notice, unless otherwise ordered, hold a hearing at which all of the producers shall be given an opportunity to be heard on the issues set forth in the application and answer. Thereafter, the Commission shall determine from the evidence adduced at such hearing the method or standard to be used in the affected pool in determining the ability of the wells therein to produce, and may make such orders, rules, and regulations as may be necessary to make such method or standard effective.

RULE 108. VACUUM PUMPS PROHIBITED

The use of vacuum pumps or other devices for the purpose of putting a vacuum on any gas or oil-bearing stratum is prohibited. The Commission may upon application permit the use of vacuum pumps in fields which are practically depleted.

RULE 109. POOL CLASSIFICATION, MARKET DEMAND, AND PRORATION

A. Each month the average well productivity of each prorated pool within this state shall be determined.—The average well productivity shall equal the quotient of the sum of the productivities of the wells therein divided by the number of wells, and shall constitute the average well size of such pool for such month.

B. Determination, hearing, allocation among pools.—The Commission shall each month, unless otherwise ordered, hold a hearing for the purpose of determining the reasonable market demand for crude oil produced in the State of Kansas for the next succeeding period and shall thereafter allocate allowed production between the several prorated pools and wells in accordance with the said demand and as provided by Chapter 227, Laws of 1939. A classification table shall be made in the proration orders so that the several classes to which the various prorated pools will be assigned upon the basis of their respective average well productivity may be determined. Such classification table shall be so constructed that the allocation thereunder will give each pool its fair and equitable share of the State allowable without unreasonable discrimination between pools.

C. Allocation within the pool.—In distributing the daily allowable of a pool among the various wells within such pool, there shall first be allowed to each well, whose calculated allowable would be less than the minimum, the minimum allowance or so much thereof as it is capable of producing. The balance of the pool allowable shall be prorated among the other wells proportional to their productivities. In no case, except as expressly provided in these rules shall more than 20 acres be considered attributable to any one well.

D. Forty-acre allowance within pools—When.—Upon application in writing to the Commission, and after due notice and hearing, at which hearing it is shown that the owners or lessees of more than 50 percent of the acreage within the probable productive limits of the pool have either joined in or approved the application or have entered into an agreement corresponding to the application, and a further showing that waste will not result and that correlative rights will not be adversely affected, the Commission may order that more than 20 acres, but not to exceed 40 acres, shall be considered attributable to a well for the purposes of determining the allocation of oil within the pool.

E. Location of wells with respect to attributable acreage.—Before more than ten acres will be attributable to a well that well must be located as near as practicable to the center of the area claimed as atrributable to it, the length of which area shall not exceed twice the width; provided, that where wells have been or hereafter are drilled on 10-acre locations in a pool that is in the process of development, and upon application to the Commission a showing is made (a) that the owner of said well or wells intends to locate the additional wells thereafter drilled on the same separately owned tract in accordance with a spacing pattern wider than one well per 10 acres; (b) that wider spacing within the pool will thereby be promoted and that neither waste nor discrimination between pools nor impairment of correlative rights will result. Any such well drilled on 10-acre location may by order of the Commission to that effect be considered as drilled in the center of a larger unit in accordance with the spacing pattern adopted for the further development of such tract, not to exceed 20 acres, except as stated in paragraph D above; provided such additional acreage credit shall not be effective until a producing offset well located on the same tract in accordance with such wider spacing pattern has been completed; provided further, that with respect to any such well drilled on a tract containing more than 10 acres but not more than the acreage which would be attributable to one well in accordance with such wider spacing pattern, a producing offset well drilled in accordance with such wider spacing pattern on an adjoining tract shall be deemed drilled on the same tract.

F. Proof of attributable acreage—Affidavit—Plat.—Before more than 10 acres will be attributed to one well the operator must file with the Conservation Division of the Corporation Commission a plat, drawn to the scale of 4 inches to one mile, which plat shall set out the location of the well and the dimensions and area of the acreage claimed attributable to it. An affidavit that the dimensions and area as shown on the plat are accurate shall accompany the plat. It shall be the duty of operators having wells located on tracts of less than ten acres to file a like plat and affidavit. The Director of the Conservation Division, or any offset operator, may cause such plat and affidavit to be filed in any case where a well is located on a tract of less than 10 acres.

RULE 110. COMMINGLING OF PRODUCTION PROHIBITED

The production from one common source of supply may be commingled with that from another common source of supply before delivery to a purchaser; provided, that the Director may prohibit such commingling upon complaint and good cause shown.

RULE 111. REPORTS BY PURCHASERS AND PRODUCERS

A. *Purchasers.*—Each purchaser or taker of any oil from any well, lease, or pool in the State of Kansas shall on or before the 15th day of each month succeeding the month in which the purchasing or taking occurs file with the Director, on a form furnished by the Commission, a verified statement of all oil purchased or taken from any well, lease, or pool in this state during the preceding month.

B. *Purchasers.*—Each purchaser or taker of waste oil from any well, lease or pool in the State of Kansas shall on or before the 15th day of each month succeeding the month in which the purchasing or taking occurs file with the Director, on a form furnished by the Commission, a verified statement of all oil purchased or taken from any well, lease, or pool in this state during the preceding month.

C. The producer or operator of each and every well in prorated pools, including minimum wells therein, shall, each month, submit to the Director a sworn statement showing the wells actually produced and an estimate of the amount of production made by each such well.

RULE 112. SHORTAGE

A. Oil wells in pools without market outlet shall not accrue a shortage for more than sixty (60) days from date of initial potential and such shortage shall be made up within the same period of time if it can be done without waste.

B. Shortages on wells that fail to make their allowable shall be cancelled. Shortages otherwise accrued shall be cancelled unless applied for by the twentieth (20th) of the month following such accrual, unless good cause is shown.

RULE 113. OVERAGE

Wells or leases which have produced in excess of their allowable for any allowable period shall be closed until such overproduction has been equalized, unless otherwise ordered by the Commission.

RULE 114. ILLEGAL PRODUCTION AND TRANSPORTATION

No purchaser, producer, operator, or any other person shall produce or transport any crude oil or waste oil from any well, lease, or pool in this state except in accordance with the Statute and the Rules, Regulations, and Orders of this Commission: Provided, that tank splitting shall not be required. The violation of the same shall subject such persons to penalties provided by law.

RULE 115. ASSESSMENT

Oil conservation assessment, in order to pay the Conservation Division expense and other costs in connection with oil and gas conservation administration not otherwise provided for, shall be made as follows:

A. There shall be assessed against the persons involved a charge of one-tenth of one cent on each barrel of crude oil or petroleum marketed or used each month. Said charge and assessment shall only apply to the first purchase of oil from the producer, and not to subsequent transfers commonly referred to as "tenderships."

B. The first purchaser of the production, who is hereby defined to be the person holding the division order and issuing checks to pay for any working interest or royalty interest, shall, before issuing checks or otherwise paying for the production, deduct one-tenth of one cent per barrel of oil marketed or used from the lease each month, and remit the amounts at the same time and periods as said purchasers make their regular oil payments.

C. Said remittances shall be made each month in a single check if the purchaser so desires, and the only accounting necessary by the purchaser shall be to show the deductions under this order on the regular payment statements to producers and royalty owners or other persons in interest.

RULE 116. PRORATION ORDER: COSTS

A charge of $8.00 per year, or 75 cents per copy, shall be made for the Monthly Proration Reports except to persons whose assessment equals or exceeds $8.00 per year, and to government and state agencies, oil and gas associations, and publications or other agencies approved by the Commission. Proof of exemption from such charge must be received in the office of the Conservation Division of the State Corporation Commission before said reports will be mailed.

RULE 117. WELL CEMENTING

The use of cement or equivalent type of material in seating casing or sealing off producing formations or fresh-water formations may be required by the Commission when ordinary methods of casing seating or use of mud-laden fluid are found to be ineffective.

RULE 118. CASING, LEAKY, DEFECTIVE, ETC.

If in any well there exists defective casing, or leaky casing seating, or faulty cementing, which permits the infiltration of water into the producing formation, and thereby causes damage to formations capable of producing oil, gas, or fresh water, the corrective procedure shall be undertaken on such wells on the written direction of the Director. The well owner may request a hearing before the Commission, whenever complaint in writing has been filed against him.

RULE 119. POLLUTION, PREVENTION OF CONTAMINATION

Every person, who shall drill, or cause to be drilled, a well or test hole, for any purpose, that penetrates formations containing oil, gas, fresh water, mineralized water, or valuable minerals, shall case or seal off such formations as may be necessary to effectively prevent migration of oil, gas, or water from or into strata that would be damaged by such migration. The effectiveness of such casing or sealing off shall be tested in such manner and by such methods and means as may be necessary, or as may be prescribed or approved by the Commission, or its authorized representatives.

RULE 120. SHUT-OFF TEST, WHEN REQUIRED

Whenever it appears to the Director that any water from any well is migrating or infiltrating into oil-bearing or gas-bearing strata or that any detrimental substances are infiltrating into underground or surface water suitable for irrigation or domestic purposes, he may direct a shut-off test, to be made at the expense of the operator or owner of such well. The Director shall fix the time for the making of such test, reasonable notice of which shall be given in writing to the owner or operator.

The owner or former producer of any abandoned oil or gas well from which water is migrating or infiltrating into any oil-bearing or gas-bearing strata, or from which any detrimental substances are infiltrating into underground or surface water suitable for irrigation or domestic purposes, shall immediately plug the well in accordance with the rules and regulations of this Commission relating to well plugging and shall prevent the infiltration of oil, gas, salt water, or other detrimental substances into underground fresh water strata.

RULE 121. FRESH WATER TO BE PROTECTED

Fresh water, whether above or below the surface, shall be protected from all avoidable polution, whether in drilling, plugging, or producing.

RULE 122. INVALIDITY OF PART

If any section, subsection, clause, sentence, or phrase of these rules is for any reason held to be invalid, such decision shall not affect the remaining portions of these rules. The Commission hereby declares that it would have adopted these rules each section, subsection, sentence, clause, or phrase thereof irrespective of the fact that any one or more of the sections, subsections, sentences, clauses, or phrases be declared invalid.

Before the State Corporation Commission of the State of Kansas

IN THE MATTER OF THE REVISION OF THE GENERAL RULES AND REGULATIONS HERETOFORE ADOPTED AND ISSUED APPLYING TO THE CONSERVATION OF THE PRODUCTION OF CRUDE OIL AND NATURAL GAS AND THE PROTECTION OF FRESH WATER AND FRESH WATER STRATA

ORDER

Now on this 23rd day of November 1939 the above-entitled matter comes on for consideration and determination upon the rehearing of said matter on the applications of the Bay Petroleum Corporation, Morgan, Flynn and Cobb, a partnership, W. L. Hartman, the Republic Natural Gas Company and H. N. Greis, trustee of the estate of the Deep Rock Oil Corporation.

In the distant past it was found expedient in the country from which our system of jurisprudence was derived to regulate business in the interest of the public welfare. But the trend of economic development in that country was such that regulation fell into disuse and finally became practically dormant. Economic theory was framed accordingly, but instances of such regulation may be found in this country when our legal institutions were in their initial stage of development; and there never was a time, either in England or America, when legal theory forbade regulation of any business or industry if public convenience and necessity demanded it (*State ex rel.* v. *Howat,* 107 Kan. 423, 198 Pac. 686).

The legal principles upon which such regulation by the state in the public interest is based were recognized in this country as early as 1877 (*Munn* v. *Illinois*, 94 U. S. 113, 24 L. Ed. 77). These principles not only have been adhered to ever since, but have been gradually expanded and adapted to meet the needs of a growing and complex economic and industrial order (*Brass* v. *North Dakota* (1894) 153 U. S. 319, 38 L. Ed. 757; *German Alliance Insurance Co.* v. *Lewis* (1914) 233 U. S. 389, 58 L. Ed. 1011; *Nebbia* v. *New York* (1934) 291 U. S. 502, 78 L. Ed. 940).

The oil industry is included in the catalogue of industries clothed with a public interest and subject to public regulation. Oil is a natural resource which cannot be replaced; and the power of the state to make reasonable regulations for the prevention of waste in the production, handling, and marketing thereof is well settled (*Ohio Oil Co.* v. *Indiana*, 177 U. S. 190, 44 L. Ed. 729; *Lindsley* v. *Natural Carbonic Gas Co.*, 220 U. S. 61, 55 L. Ed. 369). It is likewise well settled that it is within the power of the state to make reasonable regulations for the protection of the correlative rights of the owners of land over a common source of supply of oil, to prevent one from taking an undue proportion thereof to the detriment of the others, and to prevent one from committing waste to the detriment and injury of the rights of others (*Ohio Oil Co.* v. *Indiana*, 177 U. S. 190, 44 L. Ed. 729; *Lindsley* v. *Natural Carbonic Gas Co.*, 220 U. S. 61, 55 L. Ed. 369; *Oxford Oil Co.* v. *Atlantic Oil Producing Co.*, 16 F. (2d) 639, 22 F. (2d) 597; *Marrs* v. *City of Oxford*, 24 F. (2d) 541, 32 F. (2d) 134). And it is equally within the power of the state to delegate to an administrative agency the power to promulgate rules and regulations covering matters of detail for carrying into effect general legislative rules pertaining to the subject (*Plymouth Coal Co.* v. *Pennsylvania*, 232 U. S. 531, 58 L. Ed. 713; *Oxford Oil Co.* v. *Atlantic Oil Producing Co.*, 16 F. (2d) 639, 22 F. (2d) 597).

These powers have for many years been exercised in this state. Prior to the passage of the 1939 act this Commission was clothed with power to make rules and regulations in the public interest for the prevention of waste and for the regulation of the taking of crude oil from a common source of supply to prevent unreasonable discrimination therein. This was a broad power and sufficiently specific to give it validity. The duty of the Commission was to prevent waste, actual or economic, wherever it may appear, and to prevent unreasonable discrimination within a common source of supply. The power to prevent unfair taking and unreasonable discrimination was limited to a common source of supply, to the relationship of the wells within a pool. The earlier statute did not vest in the Commission authority to provide for the proration of crude oil among the several pools or common sources of supply in the state. The commission was without legal authority to make an allocation of the market demand for crude oil among the pools of the state (G. S. 1935, 55-601 to 55-605; *H. F. Wilcox Oil & Gas Co.* v. *State*, 162 Okla. 89, 19 P. (2d) 347). The statute was specific in its terms that whenever the full production of crude oil from any common source of supply could be produced only under conditions constituting waste, the Commission had the power and the duty so to limit production within such common source of supply as to prevent waste therein, and the term "waste" included production in excess of reasonable market demand. The Commission was without authority to direct a purchaser to buy or to order a producer to sell. The purchaser might buy wherever he wished and the producer might sell to whomsoever he pleased so long as the transaction did not result in waste or unreasonable discrimination within the pool.

In this connection it should be noted that by reason of diversity of ownership, royalty and otherwise, and the various grades of oil produced, the market for crude oil is as a rule in the oil fields and not at the points of refinery consumption. In this respect crude oil differs from other commodities which are marketed in consuming or financial centers. The market place for crude oil is generally if not invariably the source of production. Fortunately, from the point of view of proration, these crude oil markets are free markets. These circumstances peculiar to the oil industry promoted the practice of permitting purchasers of crude oil to select, by the construction of pipelines or otherwise, the pools from which they would purchase their requirements. This practice, if persisted in and extended, would ultimately leave many pools in the state without market outlets; and the harmful results of the practice become more and more manifest as the market demands of the state fail to keep pace with the increasing capacity of the state to produce crude oil.

It was not difficult to see that this practice, unless curtailed, might eventually concentrate the bulk of the market into a comparatively small number of the more productive pools of the state. The evil effects of such concentration were long ago felt. The allocation of the markets of the state was therefore undertaken by the cooperative efforts of the operators of the state with the aid of this Commission. The acts of this Commission, however, under the law as it then existed were largely extra-legal, and when excess or special allowables were requested, as they were by various operators when they thought it served their purpose to obtain them, there was little the Commission could do but grant them. It had no authority to prorate the market among the several pools of the state. It had no authority to prorate production from the various pools of the state on the basis of a fair share of the state market. The act of 1939 grants authority to the Commission in this respect and gives it a new statute to administer (Laws of 1939 ch. 227). Sections 2 and 3 of the statute read, in part:

"Said commission is further authorized, and it shall be its duty, to prevent unreasonable discrimination in favor of any one pool as against any other pool or pools in this State in the allocation of allowable production among such pools" (Sec. 2).

(B) The commission shall determine the reasonable market demand for crude oil produced in this state and shall allocate among the pools in the state the amount of oil that may be produced therein without waste, impairment of correlative rights and unreasonable discrimination between pools" (Sec. 3).

Other provisions of the statute will be noticed later. It is the duty of the Commission as best it can to ascertain the meaning of the law as a whole and when so ascertained to give it effect. But, in so doing, the Commission holds that its authority must be derived from the express or clearly implied terms of the statute. It rejects the theory that it should exercise, or attempt to exercise, authority derived not from specific language but by fashioning a mosaic of significance out of the innuendos of disjointed bits of the statute. At best such a course would be subtle business, calling for great wariness lest what professes to be rendering becomes creation and attempted interpretation of legislation becomes legislation itself.

The Commission accepts the 1939 act as a valid exercise of the police power of the state and in formulating and promulgating rules for its administration undertakes to give it a construction consistent with its validity and consistent with fundamental rights. It is elementary that the provisions of the act should be considered together; that no one provision should be considered to the exclusion of others; that none should be overemphasized at the expense of another or other provisions; and that any rules promulgated by the Commission which are in conformity with some of the provisions of the statutem ust of necessity also be in conformity with all of its provisions.

It would be a relatively easy task to allocate among the prorated pools of the state the amount of oil that may be produced therein without unreasonable discrimination between pools, if the provisions of the statute, above quoted, were the only provisions which the Commission must follow in so doing. But it is further provided:

"In making such allocation among the pools in the state the commission shall take into consideration, among other proper factors, and give due and proper weight to the following: (d) The prevention of waste in any pool; (e) the quantity of oil that will be produced from nonprorated pools; (f) the ratio of the daily productive capacity of each prorated pool to the total daily productive capacity of all prorated pools in the state, after the commission shall have adjusted the said respective daily production capacities of such pools by such method as the commission may find necessary to that the ratio when so adjusted and applied will result approximately in a fair and equitable allocation of the production among such pools, and as a basis for such adjustment of ratio, the commission shall make a classification of the prorated pools on the basis of the daily average productive capacities of the wells in such pools respectively, giving due consideration to the acreage reasonably attributable to each well, *so that the respective pool classifications, in their order from the smallest to the largest, will be allocated a daily rate of production in percentages on a descending scale, but so as to result in a progressively increasing average daily allowed production in barrels per well from the smallest to the largest pool classification.*"

The allocation must be so made (1) that unreasonable discrimination between pools will not result; (2) that the respective pool classifications, in order from the smallest to the largest, will be allocated a daily rate of production in percentages on a descending scale; and (3) that the result will be a progressively increasing average daily allowed production in barrels per well from the smallest to the largest pool classification.

A compliance with the first provision is a primary requisite to sustain the statute. It cannot be said that anything that complies with the second and third provisions just stated also necessarily complies with the first. Although the second and third provisions define in a general way what shall constitute undue discrimination, the variations in percentages and allowables, even though they decline and progress as required may be sufficient to constitute unreasonable treatment. However, an loocation which does not comply with the second and third provisions would be ipso facto an undue discrimination unless exceptional circumstances authorized the making of an exception thereto. The Commission is also of the opinion that the third provision is equally important with the second. The rise in the number of barrels must be comparable with the descent in percentages. In other words, the descent in percentages may be so steep and the ascent in barrels may be so gradual that unreasonable discrimination between pools will inevitably result. When the statute took away from the pools their "pool markets" and made provosion that such pools should share in the state market without unreasonable discrimination, it compensated the pools for that which had by law been taken away from them. The Commission must therefore by its orders and rules see to it that the various pools of the state get their fair and equitable share of the market demand, and the method of determining such share must be resaonable under the conditions and circumstances as they exist at the time the order is made.

The fact that one pool is permitted a greater percentage of its potential production than is another is not necessarily an undue discrimination in favor of the former. The former pool may be older or more favorably located. It may have passed the period of flush production. These circumstances may justify the larger percentage of allowable production for the pool (*Champlin Refining Co.* v. *Corporation Commission*, 51 F. (2d) 823). No doubt these facts and circumstances were taken into consideration by the legislature in enacting the present law of decreasing percentages.

However, by reason of changing conditions, rules of a state corporation commission prorating the permissible production of petroleum with a view of preventing waste, economic or physical, and to prevent inequitable or unfair taking from a common source of supply, or unreasonable discrimination in favor of one common source of supply as against another, which may have been proper at an earlier period, may become inapplicable, unjust, and arbitrary under a different set of facts and circumstances. That such is the case is suggested in the opinion of the district court in *Champlin Refining Co.* v. *Corporation Commission*, 51 F. (2d) 823, and impliedly stated in *Champlin Refining Co.* v. *Corporation Commission*, 286 U. S. 210, 76 L. Ed. 1062.

"Proration * * * changes according to conditions existing from time to time and percentages valid at one time may be inapplicable, unjust, and arbitrary at another. *Bluefield Waterworks & Improvement Co.* v. *Public Serv. Commission*, 262 U. S. 679, 693, 67 L. Ed. 1176, 1183, 43 S. Ct. 675; *Knoxville* v. *Knoxville Water Co.* 212 U. S. 1, 19, 53 L. Ed. 371, 382, 29 S. Ct. 148."

The Commission has endeavored to meet the situation and the requirements of law by a revision of the rules as herein made; and, in determining what the rules should now be, it has taken into consideration the experience and results obtained from the operation of the rules promulgated on August 16, 1939, and in effect during September and October, 1939. After being fully advised in the premises the Commission finds:

That the facts and conditions existing in relation to the allocation of production between the various prorated pools within this state as they existed at the time of the adoption of the original log-log curve classification table in 1935 have so changed that it is now necessary to modify and change said classification table so as to obtain a more equitable allocation between pools and wells.

That the evidence indicates that a well will adequately and efficiently drain twenty acres without causing waste and in order to give the acreage factor full consideration so that correlative rights within the several common sources of supply will be adequately protected, it is necessary to increase or decrease the potential of the well by ten percent for each acre greater or less than ten acres, respectively, so that the credit to be given each well in determining its allowable will be revised upward or downward in direct proportion that the area of the unit bears to ten acres. That, since the adequacy of drainage of areas larger than twenty acres has not been demonstrated by the evidence the maximum amount of acreage attributable to a well should be twenty acres and, if pools exist in which spacing larger than twenty acres would be proper, such spacing should only be approved upon the showing that such is the case. That acreage and potential should be combined into one factor to determine the productivity of a well because each of them is a necessary element to be considered in estimating the ultimate recoverable reserves underlying each of such wells. That the consideration of acreage in conjunction with potential obviates the use of theoretical wells and the Commission is of the opinion that the productivity of actual wells should be established rather than by the use of theoretical wells. Theoretical wells do not exist in fact, are not contemplated by the statute, and should be eliminated.

That the use of the acreage factor in arriving at the productivity of the well and the subsequent use of the average well productivity of each pool in allocating production between pools gives due and proper consideration to the acreage attributable to wells and pools in the allocation between pools and further consideration is therefore not necessary.

That the use of the acreage factor, as heretofore indicated, will give due and proper consideration to the same in allocating production within common sources of supply; that, since the said acreage factor has received equitable consideration in said allocation, it is not generally necessary to establish a 30-barrel minimum allowable for wells located on twenty-acre tracts or other minimum allowables for other wells that bear the same relation to fifteen barrels daily as the acreage attributable to the well bears to ten acres.

That ratable taking within the pool is disturbed by the minimum allowable established by the statute in order to prevent the economic waste caused by the premature abandonment of wells and consequently the ultimate loss of recoverable oil. That although ratable taking within the pool is desirable it should be reconciled with the statutory minimum and the effect of said minimum upon the prorated wells therein should be minimized as far as possible. That to establish a minimum other than that created by law, especially when the former is greater than the latter, tends to and will often further disturb the equitable withdrawals from the common reservoir and should therefore be avoided. That the said minimum allowable for acreage should be eliminated from the general rules in order that ratable taking between the wells and leases within the common source of supply may be promoted. If, at any time, it develops that an exception should be made in a particular instance to promote ratable taking within a pool, the provisions of Rule 100 may be invoked and the matter determined on a proper hearing.

That the practice of taking physical-potential tests has caused and, in the future, if followed to too great an extent, will cause physical waste within the reservoir and does and will place an unnecessary financial burden upon the operators. That it is desirable to adopt, if possible, some standard other than physical-potential tests to establish the daily ability of the various prorated wells to produce oil, if the results of the use of such method are reasonably accurate. That the draw-down method of taking potentials as it is described in these rules is to a certain extent experimental and so long as this condition exists the Commission should be cautious in accepting the accuracy of the results thereof to its fullest extent. That, since the accuracy of said method has only been tested and proved up to three thousand barrels, the method should be established as a substitute means for taking potential tests but the results thereof should not be accepted beyond the said three thousand barrels. That as soon as it has been demonstrated that the said method is accurate beyond said point it is hereby indicated that the Commission will accept the same to the full range of its accuracy.

That, since it is impossible to properly allocate production within and between the several prorated pools unless the daily potential of each of the wells therein is established by tests conducted by the agents of the Commission, it is necessary that such tests be taken upon all such wells. Potential tests should therefore be required to be taken of all wells in prorated pools. That the Commission, through its Director, should specify the type of approved liquid level or bottom-hole pressure gauge to be used in each draw-down test and the operator of the device so specified should be employed by the Commission and responsible to it as well as under the direction of the engineer of the Commission supervising such tests.

That the said rules should be amended and modified in all respects as is hereinbefore and hereinafter indicated and that when so modified and amended they will be reasonable and proper and within the limitations of the delegation of authority. That all special pool rules, insofar as they are inconsistent or in conflict herewith, should be cancelled, but that said special pool rules, insofar as they do not relate to matters covered by these rules or are not in conflict herewith should remain in force and effect. That the said rules as amended herein should be adopted and repromulgated to be effective as of December 1, 1939.

Therefore, after being fully advised in the premises, the Commission further finds:

That Rule 101 should be amended as follows:

1. That the definition of the average well size of a pool should be amended by striking out the figures "104" and inserting in lieu thereof "109A".

2. That the word "potential" as it appears in the definition of minimum pool should be stricken and the word "size" substituted in lieu thereof.

That Rule 103 should be amended and modified as follows:

1. That all of that portion of said Rule 103 succeeding the word "wells" as it appears in line 13 thereof should be stricken and the words "bears to the productivity of all the wells therein" should be substituted in lieu thereof.

That Rule 104 should be amended and modified as follows:

1. That the comma and the word "and" as they appear in line 2 of the first paragraph thereof should be stricken and a period substituted in lieu thereof.

2. That the words "Quotient of the total acreage attributable to the pool divided by 10" as they appear in lines 4 and 5 of the second paragraph thereof should be stricken and the words "number of wells" should be substituted in lieu thereof; the word "classification" as it appears in line 6 thereof should be stricken and all of the remainder of said paragraph after the word "month" in line 7 thereof should likewise be stricken, and the said paragraph as amended should be stricken from the said Rule 104 and reinserted in the said Rules as Rule 109A thereof, and the remaining paragraphs of said Rule 109A should be amended and renumbered as hereinafter provided.

That Rule 105 should be amended and modified as follows:

1. That the words "except wells having an average daily production of fifteen barrels or less" as they appear in lines 2 and 3 of the first paragraph thereof should be stricken from said paragraph.

2. That all of the provisions of paragraph A should be stricken and the following substituted in lieu thereof: "Potentials shall be determined by a physical test or by the draw-down method in accordance with these rules at the option of the operator or producer; provided, that the Director may require a physical test when said draw-down method is chosen, if in his opinion such method will not reasonably reflect the capacity of the well tested to produce oil."

3. That all of the provisions of the first paragraph of Rule 105B should be stricken and the following should be substituted in lieu thereof: "No well shall be assigned a potential as a result of a draw-down test in excess of three thousand barrels per day, and if such well is making water the three-thousand barrel maximum shall apply to the total liquid produced, both oil and water, so that the maximum potential assigned to any such well shall be three thousand barrels per day less the percentage of water.

4. That the word "gauger" as it appears in Rule 105D should be stricken and the words "representative of the Commission" substituted in lieu thereof.

5. That the period appearing after the word "stroke" in line 10 of Rule 105G should be stricken and a semi-colon substituted in lieu thereof, and the following should be added to the said paragraph after the said semicolon: "provided that casing pumps shall not be used during the taking of a physical test on wells which produce by both flowing and pumping unless the Director shall determine that the use of the same will not affect the accuracy of said test."

6. That the remaining portion of said paragraph should constitute the second paragraph of said rule.

7. That the following paragraph should be added to Rule 105G as the third paragraph thereof:

"Whenever the operator of a well upon which a physical test is being taken is dissatisfied with the results of the 8-hour test, he may continue to produce said well for an additional 16 hours and the amount of oil produced in said 24-hour period shall equal the potential of such well."

8. That the words "or productivities" as they appear in lines 1 and 2 of Rule 105H should be stricken.

9. That the words "echometer or depthograph" should be placed in brackets and inserted after the word "device" as it appears in line 4 of Rule 105H, and the words "bottom hole pressure bomb" should be placed in brackets and inserted after the word "gauge" as it appears in said line 4 thereof.

10. That the word and figure "five (5)" as they appear in line 13 of the first paragraph of Rule 105H should be stricken and the word and figure "fifteen (15)" should be substituted in lieu thereof, and the word and figure "fifteen (15)" as they appear in said line should be stricken and the word and figure "five (5)" should be substitured in lieu thereof.

11. That the word "consecutively" should be inserted in line 14 of the said paragraph after the word "hour".

12. That the word "productivity" as it appears in lines 4, 6, and 7 of the third paragraph of Rule 105H should be stricken and the words "of the potential" should be inserted after the word "indices" as same appear in lines 4 and 7.

13. That the word "productivity" as it appears in line 2 of the fourth paragraph of Rule 105H should be stricken and the word "potential" should be substituted in lieu thereof, and the word "and" as it appears in line 4 after the word "apparatus" should be stricken and a period substituted therefor.

14. That the words "by him" as they appear in line 5 of said paragraph should be stricken.

15. That all of paragraph 5 of said Rule 105H should be stricken and the following paragraphs should be substituted in lieu thereof:

"The Director shall specify the type of approved liquid level or bottom hole pressure gauge to be used in each draw-down test. The operator of the device so specified shall be employed by the Commission and responsible to it as well as under the direction and supervision of the engineer of the Commission supervising such test.

"On the completion of such tests the Commission shall assess the producers whose wells have been tested amounts sufficient to defray the actual expenses incurred in the taking of such tests."

That Rule 106 should be amended by adding the following paragraph as Rule 106G:

"The results of all unofficial potential tests taken on wells in prorated pools by the owner or operator thereof shall be reported to the Commission on verified forms provided therefor. Such information shall not become a part of the public records of the Commission but shall be considered as confidential and shall only be used to determine whether new potentials should be taken on the wells or pools involved."

The term "unofficial potential test" shall mean any test, not conducted under the supervision of the Commission or one of its employees, which has for its purpose the determination of the ability of such well to produce oil.

That Rule 109 should be amended and modified as follows:

1. The title to Rule 109 should be amended by adding the words "pool classification" and a comma before the word "market" as it now appears therein.

2. That the paragraph appearing in the Rules effective September 1, 1939, as Rule 109A should be stricken and the following paragraph should be added to said rules as Rule 109B:

"Determination, hearing, allocation among pools: The Commission shall each month, unless otherwise ordered, hold a hearing for the purpose of determining the reasonable market demand for crude oil produced in the State of Kansas for the next succeeding period and shall thereafter allocate allowed production between the several prorated pools and wells in accordance with the said demand and as provided by Chapter 227, Laws of 1939. A classification table shall be made in the proration orders so that the several classes to which the various prorated pools will be assigned upon the basis of their respective average well productivity may be determined. Such classification table shall be so constructed that the allocation thereunder will give each pool its fair and equitable share of the state allowable without unreasonable discrimination between pools."

3. That all of the second, third, fourth and fifth paragraphs of Rule 109A as they appear in the Rules effective September 1, 1939, should be stricken.

4. That all of Rule 109B as it appears in the Rules effective September 1, 1939, should be stricken.

5. That the comma following the word "width" in line 5 of Rule 109E should be stricken and a semi-colon substituted in lieu thereof; the words "initial stages" as they appear in line 7 thereof should be stricken and the word "process" substituted in lieu thereof; the words "and hearing after due notice" and the comma following the said word "notice" as the same appear in line 8 thereof should be stricken; the semi-colon following the word "result" in line 14 thereof should be stricken and a period should be substituted in lieu thereof; the comma following the word "above" in line 19 thereof should be stricken and a semi-colon should be substituted in lieu thereof; the semi-colon preceding the word "provided" in line 22 thereof should be stricken and a colon should be substituted in lieu thereof.

It is therefore, by the commission ordered: That the general Rules and Regulations for the Conservation of Crude Oil and Natural Gas, for the Protection of Fresh Water and Fresh Water Strata hereinabove promulgated on August 16, 1939, and effective September 1, 1939, be and the same are hereby amended and modified in accordance with the findings hereinabove made. That the said Rules as amended be and the same are hereby adopted and repromulgated to be effective as of December 1, 1939.

IT IS BY THE COMMISSION FURTHER ORDERED: That all special pool rules, insofar as they are inconsistent or in conflict herewith, shall be cancelled, but that said special pool rules, insofar as they do not relate to matters covered by these Rules or are not in conflict herewith, shall remain in force and effect.

The Commission hereby retains jurisdiction of the subject matter hereof and the parties hereto for the purpose of issuing from time to time such further orders, amendments, additional orders, rules, and regulations as may be necessary, but that these rules shall remain in effect until changed or modified.

BY THE COMMISSION IT IS SO ORDERED.

[SEAL] F. QUENTIN BROWN, *Secretary.*

Before the State Corporation Commission for the State of Kansas. In the matter of the Investigation of Alleged Wastage of Gas and the Making of Rules and Regulations Relating to the Production, Sale and Conservation of Oil and Gas, the Determining of Market Demand, the Fixing of Gas Production Percentages and Quotas for Wells, and the Establishing of Gas-Oil Ratio in the Otis Field, Rush and Barton Counties, Kansas. Docket Nos. 16,028 and 14,534 Conservation Division Order No. 37-12-28

ORDER

Pursuant to the provisions of the Conservation Laws of the State of Kansas prohibiting waste and providing for the regulation of the production of oil and gas, the Corporation Commission, after due notice, held public hearings in Wichita, Kansas, on June 29th and 30th, 1937, August 24th, 1937, September 24th, 1937, October 27th, 1937, November 23rd, 1937 and December 14th, 1937, with respect to the existence and imminence of waste of natural gas and oil in the Otis Field, located in Rush and Barton Counties, Kansas, and with respect to the existence, imminence, and prevention of undue drainage of natural gas between and underlying properties located therein, and with respect to the protection of correlative rights; from the evidence adduced at said hearings, and after due deliberation, the Commission finds as follows:

1. The Otis Field is composed of an area of approximately 17,000 acres located in Township 18 South, Range 16 West, Rush County, and in Township 18 South, Range 15 West, Barton County. The limits of the Field have not been definitely defined at the present state of development. The producing formations lie below the base of the Pennsylvanian Rocks and above the top of the Granite High or buried mountain range, and are believed to overlap the Arbuckle Limestone at the edges of the Field. Oil is sometimes found near the top of the sand but in such small quantieies as not to be commercially valuable. A little lower in the sand is the first of the two main-gas-bearing zones, where gas usually in excess of 10 million cubic feet open flow is found. Still lower a second and usually a larger volume of gas is found. In some parts of the Field, primarily along the southern edge, oil is encountered below the gas zones. Between the gas and the oil zones there is some evidence that the sand was very dense or shaly so that the stratum containing the gas and that containing the oil were separate and distinct, separated by an impervious natural seal preventing any intercommunication. In the process of development and drilling, the natural seal, where it existed, separating the oil producing formation from that of the gas, has been broken to such an extent that resultant intercommunication has taken place until the oil and gas zones are, for all practical purposes, one common source of supply.

2. In June, 1937, there were 47 wells in said Field, each of which had and now has an open flow in excess of 750,000 cubic feet of gas, and that said wells had a combined open flow of approximately 1,450,000,000 cu. ft. of gas per day. Included in the 47 wells were 12 wells which produced oil in commercial quantities in addition to the gas. That since June, 1937, several additional wells have been added to the Field, each of which has an open flow in excess of 750,000 cu. ft. thereby increasing the combined open flow of the Field as of the present time. That the available production of natural gas from said wells is greatly in excess of the market demand and current requirements for lawful purposes notwithstanding said wells were to be produced at not to exceed 25% of the gas open flow. That the market demand for gas from said field to be used for lawful purposes during the month of January, 1938, is approximately 50,000,000 cu. ft., per day, and is materially less during the warmer months.

3. When the Field was first discovered the original shut-in well head pressure of the producing formation was approximately 1040 pounds per square inch; at the present time the highest known shut-in well head pressure in the field is approximately 950 pounds, and the lowest is approximately 850 pounds with variations between leases throughout the field.

4. The methods and manner in which natural gas and oil are now being produced in the Otis Field are such as to constitute waste, as the term "waste" is defined in Articles 6 and 7, Chapter 55, General Statutes of Kansas, 1935. Such waste has taken place in varying degrees of intensity since the discovery of the Field, and a continuation of the practices and conditions that have caused and are now causing such waste is threatened and imminent. The waste heretofore and now existing in said Field is of such a substantial, destructive and serious a nature as to jeopardize the private property rights of the several owners of mineral resources of said Field and said waste materially affects the public interest, in that a continuation of the existing methods and manner of production will prematurely deplete the said Field and will substantially lessen the ultimate recovery of the gas and oil therefrom.

5. That there is now and that there has been for some time past, undue, preventable and non-compensated drainage of the underlying gas from developed properties, tracts, and leases, to other such developed properties, tracts or leases in and throughout said Field, and that this undue, preventable, and non-compensated drainage has been brought about by disproportionate, non-uniform, and unratable withdrawals of gas from wells located in said Field, and that various developed properties in said Field have suffered undue, premature, and inequitable depletion by reason of such conditions.

6. That the inequitable, unfair, and disproportionate production of the gas which is now taking place actually results in an unreasonable discrimination against various developed properties, denying to many owners of developed properties the opportunity to produce concurrently and proportionately with the owners of other wells in said field.

7. That the present methods and manner of production have caused pressure differentials to exist in said Field, and that if said present methods and manner of production are permitted to continue, many wells or developed leases in said field will not ultimately produce approximately the amount of gas underlying the land or lease on which said wells are located.

8. That for the purpose of preventing waste as defined in Articles 6 and 7, Chapter 55, General Statutes of Kansas, and for the purpose of permitting the owners of each well or developed lease to ultimately produce approximately the amount of gas underlying the land on which such well is located, and to currently produce proportionately with other wells in the common source of supply, and to discharge the functions imposed by law, it is necessary to restrict the production of natural gas, and to provide for the ratable and equitable taking thereof. The total volume of gas to be produced from said field must be restricted to an amount that can be produced without waste and used for lawful purposes, and such volume must be distributed and allocated among the various wells of the field. Such distribution and allocation can be accomplished by applying the following formula, to wit; three-fourths of the allocation to the product of the acreage containing the well by the observed pressure within the well; and one-fourth of the allocation to the open flow potential of the well; in other words, three-fourths of the total market demand for natural gas from the Otis Field should be allocated to each well in the proportion as the product of acreage times pressure for each well bears to the sum of those products for all the wells in the field; and one-fourth of the total market demand should be allocated to each well in the proportion as the open flow gas potential of each well bears to the sum of the open flow gas potentials of all the wells in the Field.

9. That the production of gas in accordance with the foregoing formula has a reasonable relation to the prevention of waste and a reasonable relation to the prevention of inequitable and unfair production of gas from the common source of supply and to the prevention of unreasonable discrimination in favor of one producer in said Field and against another producer therein and that production of gas in such manner will in fact accomplish the purposes for which Articles 6 and 7, Chapter 55, General Statutes of Kansas, 1935, were enacted.

10. The acreage to be used in the said formula shall be determined by the number of acres in the lease on which a well is situated, provided, that there is only one well on the lease. In the event more than one well is located on any one lease, the acres alloted to each well on such lease shall be determined by dividing the total number of acres by the number of wells and the quotient thereof shall be alloted to each of said wells.

11. In view of the comparative uniformity of the well-spacing (being approximately 160 acres, with a well located in the center), and the relative small size and the shape of the tracts of land covered by the leases in this Field, the Commission does not find it necessary at this time to determine the efficient drainage area of a gas well in said Field or to fix a maximum number of acres to be used in calculating the allowable of a well.

12. In determining the pressure factor to be used in the said formula, tests should be taken every six months, on or about the 15th of April and the 15th of October, and tests taken at such intervals will be reasonably frequent to prevent drainage and inequities and to protect correlative rights. The last pressure of record may be used until the next pressure readings are taken.

13. That there are a few wells in said Field that produce oil in addition to gas, and that such wells should be given an oil allowable according to the rules and regulations governing the production of oil. Such wells should also be given a gas allowable according to the formula above described. The problem becomes more complicated when the total gas allowable cannot be taken without committing waste of gas or drainage of gas as between developed leases, or when the total gas allowable cannot be taken without committing waste of oil. There are two Legislative Acts—one prohibits the waste of the production of oil and provides for an oil allowable. This is found in Article 6, Chapter 55, General Statutes of Kansas, 1935. The other prohibits waste in the production of natural gas, prohibits drainage and provides for a gas allowable. This is found in Article 7, Chapter 55, General Statutes of Kansas, 1935. A well which is capable of producing both oil and gas is given an oil allowable under Article 6 which prohibits waste including waste of reservoir energy, and requires ratable production within the market demand. Such well is also given a gas allowable under Article 7, which restricts production to prevent waste and drainage and requires ratable production within the market demand. When a well produces both oil and gas it is restricted by the limitations of both Article 6 and Article 7. Therefore, the right to produce oil from a well producing both oil and gas is restricted by the waste and drainage provisions of Article 7, as well as the waste provisions of Article 6. Likewise, the right to produce gas from a well producing both oil and gas is limited so as not to create waste of oil, including reservoir energy, and for the purpose of obtaining the greatest ultimate recovery. To preserve reservoir energy and obtain the greatest ultimate recovery, gas-oil ratios are established. The two Legislative Acts, namely, Articles 6 and 7 of Chapter 55—one providing for an oil allowable and the other for a gas allowable may be harmonized. The purpose of the two Acts is primarily to prevent waste and should be read in that light. Therefore, if in the production of an oil allowable, waste of gas is created, or unreasonable drainage occurs, the prohibition of the waste of gas and its drainage should be given effect as an additional limitation on the oil which might otherwise be produced, and if in the production of gas, waste of oil is created, the prohibition of the waste of oil, including the waste of reservoir energy should be given effect as an additional limitation on the gas which might otherwise be produced.

14. The provisions and purposes of said Articles 6 and 7, will be satisfied by permitting the owners or operators of combination wells as heretofore defined in the Rules of the Commission, producing both oil and gas, to elect to produce said wells in conformity with either the oil or gas allowables therefrom, provided, that if election is made to produce the well under the gas allowable the amount of oil produced from such well shall not exceed the oil allowable therefor; and that if election is made to produce the well under the oil allowable, the amount of gas concurrently produced with the oil shall not exceed the gas-oil ratio hereinafter established, and that within the limitations of this paragraph such combination wells shall be permitted to produce their ratable share of both oil and gas.

15. The Commission further finds that the maximum gas-oil ratio for the purpose of conserving the reservoir energy and obtaining the greatest ultimate recovery of gas and oil, should not exceed 3,000 cu. ft. to the barrel.

16. The Commission further finds that the orders made and entered in this matter on August 13th, 1937, and orders subsequent thereto, fixing gas production percentages and quotas for wells within the Otis Field should be vacated and set aside.

IT IS, THEREFORE, BY THE COMMISSION ORDERED: That the reasonable lawful, required production of natural gas, including market demand nominations for the purpose of making allocations to well in the Otis Field, Rush and Barton Counties, Kansas, for the month of January 1938, is 1,500,000,000 cubic feet.

It is further ordered: That the allowable production of gas for individual wells in said Field shall be determined by dividing the total allowable production (which includes market demand) for the whole Field, into two parts, the first part to represent three-fourths, and the second part one-fourth of the total allowable production for the Field, and that the first part shall be allocated to each well in the proportion as the product of acreage containing the well times the observed pressure at the well for each well bears to the sum of those products for all of the wells in the Field; and the second part, or one-fourth of the total allowable for the field shall be allocated to each well in the proportion as the open flow gas potential of each well bears to the sum of the open flow gas potentials of all the wells in the Field.

It is further ordered: That the acreage containing each well shall be determined by the number of acres in the lease on which such well is situated. In the event more than one well is located on any one lease, the acres allocated to each well on such lease shall be determined by dividing the total number of acres by the number of wells and the quotient thereof shall be allocated to each of said wells.

It is further ordered: That pressure tests shall be taken each six months on or about the 15th of April and the 15th of October, and that the pressure revealed as the result of such tests shall be used in calculating the well allowable for the following six months and until subsequent tests are taken. The last pressure of record may be used in calculating the allowable for each well until the next pressure tests are taken.

It is further ordered: That the Commission will cause to be issued schedules setting forth, among other things, the name of the owner of the individual wells, the name of the lease, the well number, the acreage containing the well, the open flow gas potential, and the total monthly allowable production.

It is further ordered: That every producer and purchaser producing or taking gas from wells in said Field shall prepare reports on forms furnished by the Commission, according to instructions contained within the reports, furnishing such information as is necessary for the administration of the regulations herein provided.

It is further ordered: That all wells, including those producing both gas and oil, shall be equipped with meters in order that the amount of gas produced from each well will be accurately measured.

It is further ordered: That the owners or operators of combination wells as heretofore defined in the Rules of the Commission, producing both oil and gas, shall elect to produce said wells in conformity with either the oil or gas allowables; provided, that if election is made to produce such well under the gas allowable, the amount of oil produced from such well shall not exceed the oil allowable therefor; and that if election is made to produce the well under the oil allowable, the amount of gas concurrently produced with the oil shall not exceed the gas-oil ratio hereinafter established, and that within the limitations of this paragraph, such combination wells are permitted to produce their ratable share of both oil and gas.

It is further ordered, That the maximum gas-oil ratio for the purpose of conserving reservoir energy and obtaining the greatest ultimate recovery of gas and oil shall not exceed 3,000 cu. ft. to the barrel. The gas-oil ratio of each well in the Field shall be kept as low as possible below the maximum and no well producing both oil and gas shall be permitted to produce with an inefficient gas-oil ratio.

It is further ordered, That the orders of this Commission made and entered in this matter on August 13th, 1937, and orders subsequent thereto fixing gas production percentages and quotas for well in said field should be and the same are hereby vacated, set aside and held for naught.

It is further ordered, That this Order shall become and is hereby made effective as of January 1, 1938, at 7:00 o'clock A. M., except as to that part of this order vacating, setting aside, and holding for naught certain orders heretofore made, which part is made effective immediately.

It is further ordered, That this Docket be kept open for the introduction of further evidence or information so that the Commission may at any time modify or amend this Order or enter such other or further general or special orders as may be necessary to correct or relieve any inequalities or inequities that may result from the enforcement of the provisions of this Order.

By the commission it is so ordered.

Leo R. Price, *Secretary.*

SUPPLEMENTAL STATEMENT OF ANDREW F. SCHOEPPEL, CHAIRMAN KANSAS CORPORATION COMMISSION, IN REPLY TO THE SUPPLEMENTAL STATEMENT FILED FEBRUARY 8, 1940, BY THE DEPARTMENT OF THE INTERIOR, IN CONNECTION WITH H. R. 7372

MR. CHAIRMAN AND GENTLEMEN OF THE COMMITTEE:

Under date of February 8, 1940, and after the regulatory body representing the State of Kansas had presented its case, the United States Department of the Interior filed a supplemental statement in connection with H. R. 7372 in which it attempted to set out specific allegations of physical waste occurring in the various oil producing States including Kansas.

Pages 26 to 32 of exhibit B of the report deal with conditions in Kansas. The first charges made by the Secretary of the Interior refer to restraining orders issued in suits against the Commission. Four suits have been filed, and in order that this committee know the full facts, I desire to discuss them briefly. In each action the validity of the provision of our oil Conservation Act with reference to the allocation of production between pools is under attack as well as the rules, regulations and orders of the Commission made pursuant thereto. It is obvious that when a court, having jurisdiction of the parties and of the subject matter, issues a restraining order, such order must be obeyed or the party enjoined will be in contempt of court and subject to be punished. The American way, under such circumstances, is to respect the court's restraining order until it has been set aside or declared void by a court of competent jurisdiction rather than ignore it and subject one's self to contempt proceedings as the report of the Secretary of the Interior indirectly advocates should have been done.

The first suit brought was filed in the United States district court under date of September 5, 1939. When this suit was commenced, a restraining order was issued which related to the Hittle Pool of Cowley County. This action is still pending in court, but by mutual agreement of the parties, production beginning January 1, 1940, has been and will be in accordance with the orders of the Commission. A trial will not be pressed until after a decision has been rendered in another Federal court suit involving similar issues. Therefore, the present status of this suit is that the Hittle pool is now producing in accoradnce with the orders of the commission.

The second case was also filed in the United States district court. The date of filing was September 30, 1939. A restraining order was issued involving the Otis pool. Issues have been joined, and the case is now ready for hearing on the application of the plaintiffs for an interlocutory injunction. That matter will probably be heard during the first part of March of this year. It is expected this case will eventually reach the Supreme Court of the United States for final decision.

The third suit was filed in the District Court of Cowley County on October 19, 1939. A restraining order was granted for the Weathered-Arbuckle Pool, the Weathered-Lansing K. C. pool, and the Weathered-Mississippi pool, all of Cowley County. Since then the plaintiff has filed a motion requesting permission to file a supplemental petition. A copy of the supplemental petition has been furnished our Commission. One of the paragraphs of this supplemental petition reads:

"As appears from the foregoing, defendants are no longer 'denying or interfering with the production of a sufficient amount of oil from the Weathered-Arbuckle Pool, the Weathered-Lansing K. C. Pool and the Weathered-Mississippi Pool to meet and satisfy the market demand for crude oil produced from said pools,' and said restraining order has therefore spent its force, and is no longer effective, and has not been effective since December 1, 1939, and this case has become moot except as to the issue hereinafter set forth."

The issue "hereinafter set forth" referred to in the quotation relates to "overages" that accrued from the date the restraining order was issued to the date of December 1, 1939. Therefore, the present status of this case is that the restraining order has spent its force and is no longer effective.

The fourth suit was also filed in the District Court of Cowley County. This suit was commenced on October 25, 1939. A restraining order was issued which involved the Frog Hollow Pool of Cowley County. On the motion of the plaintiff filed January 29, 1940, this suit was dismissed at the cost of the plaintiff. All overproduction occurring during the time the restraining order was in effect has been charged against the wells which were overproduced. Each of these wells will be required to make up the overproduction.

On page 29 of exhibit B of the report filed by the Secretary of the Interior there appears a schedule of production for the pools mentioned in his report. This schedule shows production for the month of October 1939, as authorized by the order of the Commission, and production for December 1939, as authorized by the restraining orders issued in the court actions. The purpose of inserting this schedule in the report apparently was to show that production under the court orders was causing excessive waste in the pools affected by them. We do not contend that production under the court orders would not cause waste, but our answer to this charge is—what, if anything, could the Commission or the State of Kansas do that it did not do? The fact that only one restraining order remains in effect and for only one pool indicates that the Commission has been diligent and successful in disposing of these cases.

The charge in the report in reference to the Burrton field has been fully covered in my remarks made before this committee a few days ago. The statement that "although some gas is still being vented to the air, the quantity is much less than it was" is not only misleading but, in substance, is incorrect. It is difficult to refute this charge not knowing the particular wells to which the report refers. The Burrton Pool covers an area of over 5,000 acres with 439 producing wells. There is a market for every cubic foot of gas produced, and if there is any venting of gas into the air, it is in no appreciable amount nor is the gas of a quality that can be marketed or sold.

The report also contains a statement that the excessive use of acid in acidizing limestone formations to increase production has proved harmful by hastening water encroachment in some instances. It is interesting to note that no specific well or lease has been pointed out as being injured by excessive acidization. It is quite easy to make a broad general statement, but why should not the Secretary of the Interior be more specific in his charges in order that this Commission may be in a position to determine the accuracy or correctness of the statement? It may be that there are some wells where acidization has hastened water encroachment, but none has come to the attention of this Commission. We are confident, however, in the belief that no material injury has been caused to any of the wells in Kansas from overacidization.

The complaint is made in the report that the taking of physical tests by the Commission to determine potentials has caused water encroachment and waste. In my previous statement before this committee, I introduced, as a part of my exhibits, a copy of the rules and regulations of the Commission governing the production of crude oil. I refer you to rule 105 which sets out in detail the methods which may be used for taking potentials. It will be noted from the reading of this rule that potentials may be taken either by physical tests, as provided by Rule 105g, or by the draw-down method, as provided by Rule 105h. If the draw-down method is selected, the maximum potential any well may be assigned is 3,000 barrels per day. The reason for fixing a maximum is that the method has not been proven accurate above 3,000 barrels. I would estimate that 95 percent of the prorated wells in Kansas may be accurately tested by the draw-down method since their potentials would not exceed 3,000 barrels daily. On the other hand, there are a number of wells capable of producing more than 3,000 barrels. In order to adopt valid rules for the taking of potentials, the Commission felt that producers owning such wells were entitled to a method which would reflect their ability to produce. Therefore, the Commission adopted the only other recognized method which was the taking of physical tests. Was the Commission wrong in doing so, or should it arbitrarily have forced all operators to take tests by the draw-down method with a top potential of 3,000 barrels when, in fact, some of the wells could actually test 10,000 barrels? Such a rule would be arbitrary, unreasonable, and unconstitutional. Should the Commission be criticized for promulgating a rule that is reasonable and not arbitrary or capricious? Physical tests may cause water encroachment in some instances, but only wells with large potentials would be selected for physical tests. The probability of causing water encroachment is considerably less on wells with large potentials than on wells with small potentials. Physical tests are expensive. They necessitate the use of heavy and expensive machinery. The draw-down method is inexpensive. It is, therefore, the opinion of the Commission that whenever possible the drawn-down method will be used in Kansas; that it will only be in rare instances that an operator will request a physical test. Physical tests will only be taken on wells that can be tested without injury. So far as the Commission knows, no well has been injured as a result of any test that it may have been subjected to to determine its potential since the adoption of the new Rules and Regulations which became effective December 1, 1939.

The final charge made in the report concerns inadequate plugging of 11 abandoned wells in southeastern Kansas. The report does not specify the wells to which it refers. Therefore, a specific reply cannot be made. The first oil well was plugged in Kansas in 1882. Since that time it is estimated that over 15,000 oil wells in southeastern Kansas have been plugged. Many of these wells were abandoned long before we had any statute regulating plugging. If only 11 wells in southeastern Kansas, which includes some 22 counties, have been inadequately plugged, then we have almost a perfect record. We are willing to stand on that record. It is about as accurate as anyone could expect in view of the facts and circumstances existing and which have existed in the past.

Respectfully submitted.

Kansas Corporation Commission.
By Andrew F. Schoeppel, *Chairman.*

STATEMENT OF R. P. JACKSON, SECRETARY, OIL CONSERVATION BOARD, STATE OF MONTANA

Mr. Kelly. We will hear you, Mr. Jackson.

Mr. Jackson. Mr. Chairman, my name is Robert P. Jackson. I reside at Great Falls, Mont., and am now the secretary of the Oil Conservation Board of the State of Montana.

Mr. Cole. Mr. Jackson, I am sorry to have to leave, but I will read your statement with much interest.

Mr. Jackson. Thank you.

Mr. Kelly. Mr. Jackson, you may proceed.

Mr. Jackson. Mr. Chairman, I will ask permission to read a comparatively short statement here and perhaps save time. We do not have a great deal to offer for Montana. My name is Robert P. Jackson. I reside at Great Falls, Mont., and am now the secretary of the Oil Conservation Board of the State of Montana. I have held that position ever since the board was created, which was in January 1934.

The board is composed of five members who were appointed by Gov. Roy E. Ayers to serve during the 2-year period ending January 8, 1942. All of the members have resided in Montana for many years and four of them are engaged in the production of crude petroleum within the State of Montana. The names and addresses of said members are stated as follows:

L. B. O'Neil, Cut Bank, Mont., chairman, oil producer and refiner.

W. E. Rice, Great Falls, Mont., vice chairman, oil producer and refiner.

Wilfred F. Nadeau, Cut Bank, Mont., oil producer and pipe-line operator.

George R. Downs, Shelby, Mont., oil producer.

Tom Stout, Lewistown, Mont., newspaper publisher and formerly a Member of the United States Congress from Montana.

Wilfred F. Nadeau, member of the board, and myself, as secretary, have been authorized and directed by the board to appear before this committee and give you all information available concerning conditions in Montana, past and present, pertaining to the matters and things referred to in H. R. 7372.

Mr. O'Neil and Mr. Rice, chairman and vice chairman, respectively, of the board, were physically unable to make the trip to Washington.

About 2 months ago our board adopted resolutions regarding H. R. 7372, after careful study of its terms, and mailed a copy to Chairman Cole. If permissible, I will offer that copy or another copy of the resolutions that I have here without reading it.

Mr. Kelly. You may do so. It is in the record.

Mr. JACKSON. In view of the fact that Montana's petroleum production represents such a small percentage of the Nation's total and our production control and conservation problems appear so trivial when compared with those reported from other States and districts, our board members were at first inclined to offer this committee nothing more than the resolutions adopted relative to the Federal control measure proposed. However, the matter was reconsidered in the light of an invitation received from Chairman Cole, a flood of protests received from crude oil producers in Montana during the last few weeks, and the advice of Hon. Roy E. Ayers, Governor of Montana.

Governor Ayers appeared before you a few days ago, as you doubtless recall, and this statement may be regarded as supplemental to his statement, for the purpose of supplying detailed information that may be of interest in connection with your consideration of the bill in question.

It is my understanding that the officers and representatives of petroleum conservation boards and bureaus of the petroleum producing States are expected to present facts and figures pertaining to two questions that your committee considers of vital importance; that is, is the State conservation law, or laws, as to each State involved, sufficient to create power or authority in the State's agency or agencies to properly control and regulate the production of crude petroleum, and second, has such regulatory power and authority, if granted, been properly and efficiently exercised by the State's agency or agencies. As to the State of Montana, I believe that the correct answer to both questions is yes. In making that answer I would add, however, that I am sure that the petroleum-production control and conservation laws could not be, or would not be, so construed as to invest power or authority in any agency of the State equal to those proposed by the terms of H. R. 7372 to be delegated by Congress to a Federal commissioner to be appointed by the Secretary of the Interior.

The petroleum producing history in Montana dates from about 1913, when natural fuel gas was discovered in a well drilled near Hardin, Big Horn County. During the following few years additional natural-gas discoveries were made in widely separated areas in northern and eastern Montana and the Elk Basin oil and gas field, located on the Montana-Wyoming State lines, was discovered. The industry assumed little importance in the State until the discovery of the Cat Creek oil field, located in central Montana, in February 1920—about the time of the enactment of the Federal land oil and gas leasing law approved by President Wilson on February 25, 1920 (41 Stat. 437). Up to that time the only law we had affecting petroleum deposits was one that required those who drilled wells and later abandoned the same, to plug them according to certain simple specifications and file affidavit showing the facts and location of the abandoned well with the county recorder of the county within which the well was located. That law was repealed, I find, by the act of 1925, to which I will refer later.

The discovery oil well in the Cat Creek was drilled on what is known as fee land, which is interpreted to mean land included in a patent granted by the United States to an individual under one of the agricultural or land script laws free from any mineral reservation.

It may be well to say here that we have five separate classes of land titles to deal with in Montana, viz:

1. Public lands entirely owned by the United States.
2. Indian reservation lands. Some allotted to Indians who are wards of the United States or Secretary of the Interior and some held by the tribal government subject to disposition by approval of the Secretary of the Interior.
3. Fee lands.
4. State lands; that is, lands included in grants by the United States to the State for the use, support, or benefit of State institutions.
5. Railroad lands, that is, lands granted by the United States to railroads as bonus, or reward, for railroad construction at certain times and under certain conditions.

The discovery oil well in Cat Creek field proved to be of little commercial importance, but it was soon followed by several very productive oil wells drilled principally on land owned by the United States which had been included in oil and gas prospecting permits held by individuals. About that time the Interior Department issued drilling, operating, and plugging regulations applicable to all wells and leases, or permits, in which the United States had an interest. Approximately two-thirds of the one-hundred-and-fifty-odd wells drilled in the Cat Creek field were located on land owned by the United States. As late as January 1, 1940, our records show that 81 out of the 119 oil-producing wells in that field were on United States owned land and hence subject to the regulations prescribed by the Secretary of the Interior.

The Cat Creek field being the first oil-producing field of importance in Montana and the Secretary of the Interior having prescribed the rules for drilling, casing, and operating oil wells first completed therein, the operators in that field necessarily complied with those rules as to wells on United States owned land and operators on other land in the neighborhood voluntarily adopted like practices because they were found reasonable, sound, and sufficient and there have been very few operators in Montana who failed to respect and follow established drilling and casing practices in any field.

In the spring of 1922 crude oil was discovered in the Kevin-Sunburst field in Toole County, in a large geological structure thereafter surveyed by the United States Geological Survey and classified as containing approximately 88,000 acres as divided into three parts, that is, Kevin-Sunburst, Gas Ridge, and Shelby producing fields. About 1 year previous to that discovery the legislative assembly enacted chapter 8 of the Session Laws of 1921, approved March 22, 1921, defining common-carrier petroleum pipe lines; empowering the board of railroad commissioners to regulate pipe-line rates and business, prohibiting discrimination by pipe lines, and so forth.

Many of the operators who entered the Kevin-Sunburst field were experienced in operations in the Cat Creek, Elk Basin, and other fields of the Northwest where Interior Department drilling and operating standards had been established. Those standards were generally adopted in the new fields, also in adjacent areas where many wildcat test wells wre drilled and later abandoned.

Some small number of unscrupulous and irresponsible drillers and promoters soon took advantage of the lack of a State control law, absence of bonding requirements, and so forth, and it became necessary to enact a suitable law to protect fee and State-owned lands.

The State legislative sessions were then, and are now, held every 2 years; that is, the first 60 days of each odd-numbered year. At the 1923 session the need of a State law was not apparent, or was not realized, and it was not until the 1925 session that the situation was remedied by enactment of chapter 56, laws of the 1925 session, which provided, to wit:

> That the Board of Railroad Commissioners of Montana is required to supervise the drilling, abandonment, and plugging of oil and gas wells on all lands, except those owned by the United States, within the State of Motana, and required the board to adopt and promulgate the same regulations from time to time prescribed by the Bureau of Mines of the Interior Department of the United States.

The law and the regulations promulgated thereunder were quite comprehensive and adequate to meet the requirements of that period as recommended by competent engineers. It is assumed to be unnecessary to quote them at length in this statement and copies thereof will be furnished if desired by your committee. Would that be desired?

Mr. Kelly. Yes; that would be well for the committee to have those.

(The matter referred to is as follows:)

Operating Regulations to Govern the Production of Oil and Gas on State and Private Lands in Montana, Chapter 56, Laws of 1925

INTRODUCTION

Chapter 56, Laws of 1925, provides that the Board of Railroad Commissioners of Montana is required to supervise the drilling, abandonment, and plugging of oil and gas wells on all lands, except those owned by the United States, within the State of Montana, and requires the Board to adopt and promulgate the same regulations from time to time prescribed by the Bureau of Mines, of the Interior Department of the United States.

The following Rules and Regulations have been adopted by the Board in conformity with the Rules and Regulations of the U. S. Bureau of Mines and will govern oil and gas operations on all lands, except those of the Government, within the State of Montana except where modified by special orders.

DEFINITIONS

The following terms used in these regulations shall have the meanings here given:

Supervisor: An agent appointed by and with the power to act for the Board of Railroad Commissioners of Montana.

Representative—Local representative: Any employee of the Board of Rail-Road Commissioners who is designated by the Supervisor to act for him in any specified part or all of the State.

Board: When reference is made to the "Board" it shall be understood to mean the Board of Railroad Commissioners of Montana.

Operator: The term operator shall be understood to refer to any and all persons, companies, corporations, syndicates, or partnerships conducting oil or gas operations on lands included in these regulations.

WITH WHOM TO DEAL

Operations.—In matters pertaining to drilling and producing operations the operator should deal with the Supervisor, or his local representative.

STATE LANDS

In matters pertaining to the leasing or purchase of State Lands interested parties should deal with the Register of State Lands, Helena, Montana.

TAXATION

Property Tax: On machinery, tools, buildings, real property, etc. Assessed by County Assessor and tax paid direct to County.

Oil Production Tax: 2% on value of all crude oil produced. Paid quarterly to State Board of Equalization, Helena, Montana, on blanks furnished by that Board.

Net Proceeds Tax: On net proceeds of all operations after allowing certain deductions. Reported yearly to State Board of Equalization, Helena, Montana, on blanks furnished by that Board.

Corporation License Tax: 1% on net earnings less arbitrary deduction of $2,500.00. Reported annually to State Board of Equalization, Helena, Montana, on blanks furnished by that Board.

PURPOSE OF SUPERVISION

The Board will require that operators comply with these regulations and operate their properties in a manner in keeping with the best practice for the locality. Inasmuch as any specific and binding regulations drawn for one field may not be applicable to other portions of the State, the following regulations are purposely broad in scope, the details of interpretation being left to the supervisor.

Section 1. Powers and Duties of Supervisor: It shall be the duty of the Supervisor directly or through his representatives:

(a) To visit from time to time lands where operations for the discovery or production of oil and gas are conducted, to inspect and supervise such operations with a view to preventing waste of oil and gas, damage to formations or deposits containing oil, gas or water or other mineral deposits, injury to life or property, or economic waste; and to issue, in accordance with the provisions of existing regulations, such necessary instructions to operators as will effectively prevent such waste or damage.

(b) To make reports to the Board as to general conditions and the manner in which operations are being conducted and the departmental orders are being obeyed and such other information as the Board may require.

(c) To prescribe the manner and form in which all records of operations, reports, and notices shall be made by operators.

(d) To require that tests shall be made to detect wastes of oil and gas, as well as the presence of oil, gas, or water in a well, and to prescribe or approve the methods of making such tests.

(e) To require the correction, in a manner to be prescribed or approved by him, of any condition existing subsequent to the completion of a well which is causing or is likely to cause damage to any formation bearing oil, gas, water, or other mineral deposits or which is dangerous to life of property or wasteful of oil or gas.

(f) To determine the percentage of the potential capacity of any gas well which may be utilized when, in his opinion, such action is necessary to protect the gas-bearing formations. He shall likewise specify the time and method for determining the potential capacity of gas wells.

(g) To assist and advise operators making tests and carrying on experiments for the purpose of increasing the efficiency of operation.

(h) To compile records of production of oil and gas.

(i) To require, by written notice, immediate suspension of any operation or practice contrary to the requirements of these regulations, or to the written orders of the supervisor or his representative until the operator shall have complied with such requirements or orders.

Section 2. Requirements for Operators: (a) The operator on State lands shall conform to the terms of his lease and all operators shall conform to these regulations and to the written instructions of the supervisor or his representative and shall take precautions to prevent waste of oil or gas, damage to formations or deposits bearing oil, gas, water, or other mineral deposits, injury to life or property, or economic waste.

(b) The operator shall designate in writing the name and post office address of a local or resident representative on whom the supervisor or other authorized representative of the Board of Railroad Commissioners may serve notice or with whom he may otherwise communicate in securing compliance with these regulations. The resident representative of the operator shall be designated before drilling or other operations are begun.

If said designated representative shall at any time be absent form his designated address and no substitute representative has been designated to act in his stead, any employee of the operator who is on the premises, or the contractor or other person in charge of operations shall be considered the representative of the operator for the service of written orders or notices and service in person or by ordinary mail upon any such employee, contractor, or other person shall be deemed service upon the operator.

(c) The operator shall not drill any well within 220 feet of any of the outer boundaries of the land being developed except as may be necessary to protect himself against off-set wells on other lands and then only on consent first had in writing from the supervisor.

(d) The operator shall not begin to drill, redrill, make water shut off or formation test, deepen, shoot, plug, or abandon any well, or alter the casing in it without first notifying the supervisor of his plan or intention and receiving approval prior to commencing the contemplated work.

(e) The operator shall permanently mark all rigs or wells in a concpicuous place with his name or the name of the actual operator and the number or designation of the well, and shall take all necessary means and precautions to preserve these markings.

Abandoned wells shall be marked with a permanent monument which shall consist of a piece of pipe not less than four inches in diameter and not less than ten feet in length, of which four feet shall be above the ground level, the remainder being embedded in cement. This pipe shall be capped with a screw cap.

(f) The operator shall keep on the premises or at his headquarters in the field accurate records of the drilling, redrilling, deepening, plugging, or abandoning of all wells and of all alterations to casing, records to show all the formations penetrated, the content of oil, gas, or water in each formation, and the kinds, weights, landed depths, and sizes of casings used in drilling the wells. Within fifteen days after the completion of any well and within fifteen days after the completion of any further operations on it the operator shall transmit to the supervisor copies of these records on prescribed forms furnished by the supervisor. The operator shall also submit such other reports and records of operation as may be required in the manner and form prescribed by the supervisor.

(g) In drilling in "wildcat" territory or in a gas or oil field where high pressures are likely to exist the operator shall take all proper precautions necessary for bringing the well under control at any time and shall provide at the time the well is started the proper high-pressure fittings and equipment required for such work. Good practice under such conditions requires that the conductor string of casing be cemented around the casing shoe.

(h) When drilling with cable tools the operator shall provide at least one properly prepared slush pit, into which he must deposit mud or cuttings from clay or shale free of sand that will be suitable for the mudding of a well, except when he is drilling in a proved area where it is known that such precautions are not necessary. When required, a second pit must be provided for sand pumpings and other material extracted from the well during the process of drilling that are not suitable for mudding.

(i) When drilling with rotary tools, the operator shall provide when required by the supervisor or his representative, an auxiliary mud pit of suitable capacity in which he can maintain a supply of extra heavy mud for emergency use in case of blow-outs or lost circulation. When required, surplus mud and cuttings shall be confined in suitable pits.

(j) The operator, by methods approved by the supervisor or his representative, shall effectually shut off and exclude all water from any oil or gas bearing stratum and shall make a casing and water shut-off test before suspending drilling operations or completing the well and drilling into the oil or gas sand.

The operator shall also effectually test for commercial productivity all formations that give evidence of carrying oil or gas, the test to be made in a manner approved in advance by the supervisor. Unless otherwise specifically approved by the supervisor or his representative, formation tests shall be made at the time the formations are penetrated and in the absence of excessive back pressure from a column of water or mud fluid.

(k) The operator shall not deepen an oil or gas well for the purpose of producing oil or gas from a deeper stratum unless the upper productive strata are properly protected.

(l) The operator shall prevent any oil or gas well from blowing open and shall take immediate steps and exercise due diligence to bring under control any "wild" or burning oil or gas well or any water well.

(m) The operator shall operate his wells in such manner as to eliminate, as far as possible, the formation of emulsion, or so-called B. S. If the formation or emulsion, or B. S., can not be avoided and the oil can not be recovered from the emulsion by usual methods of treatment, the operator shall treat the oil to put it into a marketable condition if it can be recovered at a profit. To avoid excessive losses from evaporation or "burning the oil" the operator shall not heat emulsified oil for the purpose of breaking down emulsions to temperatures above the minimum temperature required to put the oil into marketable condition.

(n) B. S. and salt water from tanks or well shall not be allowed to pollute streams or damage the surface of adjoining land. If the B. S. can not be treated or burned and the volume of salt water is too great for disposal by seepage and evaporation, the operator should consult the supervisor or his representative regarding its disposal and dispose of it under some approved method.

(o) All oil run from leased State lands shall be gauged according to methods approved by the supervisor. The operator shall provide tanks suitable for containing and accurately measuring the crude oil produced from the wells and shall furnish to the supervisor or his representative two acceptable copies of all tank tables. The operator shall not, except during an emergency and except by special permission of the supervisor or his representative, confirmed in writing, permit oil to be stored in earthen reservoirs or in any other receptacles in which there may be undue waste of oil by seepage or evaporation.

(p) Before abandoning a well the operator shall submit to the supervisor a statement of reasons for abandonment and his detailed plans for carrying on the work, together with a copy of the log in case it has not already been submitted, and shall proceed with the abandonment only on receiving the written approval of the supervisor and in the manner prescribed by such official.

No producing oil or gas well shall be abandoned unless it is demonstrated that further operation is commercially unprofitable.

(q) The operator shall prevent the waste of natural gas or its wasteful utilization. The use of gas in its natural state in engines, pumps, or similar equipment where its pressure is the direct operating force is prohibited unless the exhaust gas is conserved for use as fuel or unless special permission is obtained from the supervisor.

(r) The operator shall exercise reasonable precaution in providing against accidents and fires and shall make a full report to the supervisor of all accidents or fires which occur.

(s) The operator must immediately obey all orders intended to carry out the terms and spirit of these regulations. Subjects of controversy may be settled in conference between the operator and the supervisor but the supervisor shall have final authority subject to the right of appeal as provided in Section 5 hereof.

SECTION 3. Oil Royalties: Oil royalties accruing to the State of Montana from operations on State lands shall be paid in accordance with the terms of the lease or contract between the operator and the State Board of Land Commissioners.

SECTION 4. Reports to Be Made by Operator.

INTRODUCTION

In operating to know the property is to know the individual wells on it. For this reason much of the information requested concerns individual wells. Experience has shown that these data are necessary for engineering studies that often enable the supervisor to offer valuable advice on the handling of properties. Forms for making reports to the supervisor, described in this section, can be obtained from the supervisor or his representative, and such forms, unless others are specified by the supervisor, must be used by the operator. Operators must fill out all forms completely and file them punctually with the supervisor.

Monthly Report of Operations (*Form 329b*).—This form is required as a regular monthly report, regardless of the status of operations, and must be filed with the BOARD OF RAILROAD COMMISSIONERS, Oil & Gas Well Division, by the tenth of the succeeding month.

Log of Well (*Form 330b*).—The operator shall furnish to the supervisor or his representative, upon his demand, a partial or complete log of any well and shall file in duplicate with the supervisor not later than fifteen days after the completion of each well a complete and accurate log on Form 330b.

The operator shall require the drillers, whether company labor or contract labor, to record accurately the depth, character, fluid content and fluid levels, where possible, of each formation as it is penetrated, together with all other pertinent information called for by this form. The practice of compiling logs from memory, sometimes after the work has been completed, will not be permitted.

Sundry Notices and Reports on Wells (*Form 331b*).—Form 331b covers all notices and all reports pertaining to individual wells except those for which special blanks are provided. This form may be used for any of the purposes listed, or a special heading may be inserted on the blank to adopt it for use for similar purposes. Any written intention to do work or of change in plans must be filed in duplicate unless otherwise directed and must reach the supervisor and receive his approval before commencement of the work.

One copy of the form will be returned to the operator if and when approved and will constitute his authority to begin work. The operator is responsible for receipt of the notice by the supervisor in ample time for proper consideration and action. If in case of emergency any notice is given orally or by wire and approval is obtained, the transaction shall be confirmed in writing as a matter of record.

The examples following illustrate some of the uses to which Form 331b may be put.

Notice of Intention to Drill (*Form 331b*).—The notice of intention to drill a well must be filed in duplicate with the supervisor and approval received before the work is commenced. This notice must give the location in feet from property lines and, if possible, the elevation of the derrick floor and the geologic name of the surface formation; also an estimate of the depth at which and the stratum or formation in which the oil or gas is expected and approximately the depths at which specified strings of casing will be set or landed; also the weight of the sizes of casing proposed to be set or landed at these depths, and a statement as to whether any cementing, mudding, or other special work is contemplated.

Notice of Intention to Change Plans (*Form 331b*).—Owing to unexpected conditions, it may become necessary to change the plans of proposed work in connection with either the drilling or the repair of wells. Complete details of these changes should be submitted in duplicate to the supervisor and approval obtained before the work is undertaken.

Notice of Date for Casing and Water Shut-Off Test (*Form 331b*).—As exclusion of water from oil and gas bearing strata is one of the most important items of conservation, the supervisor or his representative will witness as many casing and water shut-off tests as possible. Form 331b should be filled out and filed in duplicate with the supervisor in advance of the approximate date on which the operator expects to make the test. Later the exact date may be fixed by agreement.

Report on Result of Casing and Water Shut-Off Test (*Form 331b*).—If the supervisor or his representative authorizes but does not witness a casing or water shut-off test, the operator shall submit in duplicate a statement signed by the employee in charge of the work giving details and results of the test. The information given must be complete and include such items as depth of shut-off; head of water found; depth and thickness of water strata penetrated before landing pipe; weight, nominal diameter, and depth of casing in the hole; fluid levels before and after test; length of time the well stood for each test; depth drilled out below shoe, if any; note of oil or gas showing; length and character of bridge, if used; method of shut-off; amount and name of cement and time given to set; and any other pertinent data.

Notice of Intention to Redrill or Repair Well (*Form 331b*).—If it seems desirable to make repairs in or to deepen a well, a detailed written statement of the plan of work shall be made in duplicate to the supervisor and approval obtained before the work is started. In work that affects only rods, pumps, or tubing or other routine work, such as cleaning out, no notice or report will be necessary.

Notice of Intention to Shoot (*Form 331b*).—Before shooting any well, for any purpose, notice of intention to shoot shall be given to the supervisor in duplicate and approval obtained before shooting is done. When the notice of intention to shoot becomes a part of a notice of intention to redrill, repair, or abandon a well, the supervisor may accept such notice in lieu of a separate notice of intention to shoot.

The notice of intention to shoot must be accompanied by the complete log of the well to date, provided the complete log has not previously been filed, and must state the object of shooting, the size and kind of the proposed shot, the exact location and distribution of the explosive in the well (by depths) and the name of the company that is to do the shooting. The notice shall also contain an accurate statement of the daily oil and water production, if any, at the time the notice is filed or at the date of last production.

Subsequent Record of Shooting (*Form 331b*).—After shooting any well a subsequent record of shooting must be filed in duplicate with the supervisor. This record shall be filed separately on Form 331b within thirty days after the shooting is done, except where such shooting record constitutes a part of the log (Form 330b) or a part of a record of other subsequent work done (Form 331b) or a part of an abandonment record filed within that period. The subsequent record of shooting shall include a statement of the size of the shot and the nature, exact location, and distribution of the explosive used in the well (by depths). The record shall contain also an accurate statement of the average daily production of oil and water for at least a ten-day period prior to the filing of the report. In addition, this report should include other pertinent information, such as depth of cleaning out, time spent in bailing and cleaning out, and possible injuries to the casing or the well.

Record of Perforating Casing (*Form 331b*).—Usually a statement covering the details of perforated casing in a well is made on the log form. When perforations are made after the log has been sent in a report of the work shall be made in duplicate to the supervisor on Form 331b. Prior notice need not be given for such work, except that if it is intended to perforate casing that has excluded water from the well a notice in duplicate of intention to perforate and approval of the supervisor are necessary before the work is begun.

Notice of Intention to Pull or Otherwise Alter Casing (*Form 331*).—If it is desired to pull a portion or all of a string of casing, or to rip, perforate, or otherwise alter casing that has excluded water from a well, a notice (Form 331b) of such work must be given in duplicate and the approval of the supervisor obtained before the work is started. When it is desired only to add casing without deepening the well and without altering the water string already in the well, it will be sufficient to report the operations on a subsequent notice of work done.

Notice of Intention to Abandon Well (*Form 331b*).—Before beginning abandonment work on any well, whether drilling well, oil or gas well, water well, or so-called dry hole, notice of intention to abandon shall be filed in duplicate on Form 331b with the supervisor and approval obtained before the work is started.

The notice of intention to abandon must show the reason for abandonment and must be accompanied by a complete log of the well to date, provided the complete log has not been filed previously, and must give a detailed statement of the proposed work, including such information as kind, location, and length of plugs, by depths, and plans for mudding, cementing, shooting, testing, and removing casing as well as any other pertinent information.

Subsequent Report of Abandonment (*Form 331b*).—After abandoning or plugging a well a subsequent record of work done must be filed in duplicate with the supervisor. This record shall be filed separately, Form 331b, within thirty days after the work is done except where such record constitutes a part of the log, Form 330b, or record of other subsequent work done, Form 331b, and is filed within that period.

The subsequent report of abandonment shall give a detailed account of the manner in which the abandonment or plugging work was carried out, including the nature and quantity of materials used in plugging and the location and extent, by depths, of the plugs of different materials. Records of any tests or measurements made and the amount, size and location, by depths, of casing left in the well as well as a detailed statement of the volume of mud fluid used, the pressures attained in mudding, and the names and positions of employees who carried out the work. If the well was shot this report must include a complete statement of the shooting, giving the details as called for under "Subsequent Record of Shooting."

Supplementary Well History (*Form 331b*).—A report of all work done on any well since the filing of the log form (Form 330b) or the last report covering work on well shall be filed in duplicate with the supervisor on Form 331b within thirty days after the completion of the particular work, or before, if called for by the supervisor.

SECTION 5. The operator must immediately obey all orders intended to carry out the terms and spirit of these regulations whether issued directly by the supervisor or sent to the operator or his agent by ordinary mail, but any such order, after being put into effect by the operator, shall be subject to review by the BOARD OF RAILROAD COMMISSIONERS OF MONTANA upon appeal to said BOARD filed with the supervisor within thirty days after the order has been served.

Approved by the BOARD OF RAILROAD COMMISSIONERS OF MONTANA April 22nd, 1927.

DANIEL BOYLE, *Chairman.*
LEONARD C. YOUNG, *Commissioner.*
LEE DENNIS, *Commissioner.*
E. G. TOOMEY, *Secretary.*

Mr. Jackson. One section of the regulations adopted is notable as an example of advanced ideas in government control in the minds of the Railroad Commissioners at that time, to wit:

> No producing oil or gas well shall be abandoned unless it is demonstrated that further operation is commercially unprofitable.

Operations in the producing oil and gas field, as well as in "wildcatting" areas, were generally active for several years thereafter and there were very few violations of the State law and regulations serious enough to demand action under the enforcement provisions of the statute. By the end of the year 1933 all of the petroleum producing fields now known to be, or to have been, of commercial importance had been discovered and developed to some extent; that is, 6 fields producing natural gas only and 12 fields producing oil or oil and gas. Bannatyne oil field was abandoned in 1936 after several years producing history and Mosser Dome is still regarded as doubtful after producing several thousand barrels of oil in 1937.

In 1933 the Federal National Industrial Recovery Act was enacted and the Federal code of fair competition for the petroleum industry was promulgated by the President of the United States thereunder.

This development aroused interest in the adequacy and status of the Montana laws on the subjects covered by the new Federal law and code thereunder. Investigation by State officers and others concerned disclosed apparent weaknesses in existing laws that it was felt should be cured and that could only be accomplished by enacting additional law. The result was the enactment of what is known as the oil conservation law, although the law is applicable, by its terms, to crude petroleum, approved December 29, 1933. (See chapter 18, special session, laws of 1933-34). The title of said act will be sufficient to read.

> An act to prohibit and prevent the waste of crude petroleum in the State of Montana;
>
> Creating an oil conservation board;
>
> Providing for the appointment of the members of said board;
>
> Providing the powers, duties and authority of said board and the members thereof;
>
> Providing for the filing and hearing of complaints concerning waste of crude petroleum, and for oaths, subpenas and depositions;
>
> Providing for the cooperation of said board with the Government of the United States and department or bureau thereof in the administration and enforcement of the National Industrial Recovery Act and any order, rule, regulation or code promulgated thereunder insofar as relates to the petroleum industry;
>
> Providing for the enforcement of the act and the rules, regulations, and orders of said Board and creating a fund for the purposes of said act and providing for the assessment and collection thereof.

As originally enacted the life of the law was limited to the life of the National Industrial Recovery Act, but before the latter was held unconstitutional by a decision of the United States Supreme Court, rendered in May 1935, the said Montana statute was amended to remove the limitation clause.

At the 1937 session of the legislative assembly the act was further amended to the extent, only, of reducing the rate of tax imposed on the crude petroleum producers for the support of the regulatory agency. I will submit herewith a copy of that law, as originally enacted and as it now stands by amendment. It is somewhat lengthy and I will not read it unless you so direct, but it contains two sections that I shall quote because of particular reference thereto in this statement, to wit:

Sec. 9. The conservation board shall have general power and it shall be its duty: * * *.

4. To determine and prescribe what producing wells shall be defined as "stripper wells," and to make such orders as in its judgment shall be required to protect said wells, and to provide that such wells may be produced to capacity if it is deemed necessary in the interest of conservation so to do, notwithstanding allocation or restriction of production of other wells.

Sec. 20. Nothing herein contained shall be construed to derogate any powers of the Board of Railroad Commissioners of the State of Montana or the Public Service Commission of the State of Montana.

At the date of enactment of said act, December 29, 1933, there were 6 fields in the State wherein natural gas only was being produced and there were 12 additional fields in which crude oil only or crude oil and gas were being produced. There was no apparent necessity, or demand, for regulating either oil or gas production. Soon after its organization meeting, which was early in January 1934, the oil conservation board was supplied with production records for the year 1933 which showed, to wit: 1,353 crude oil producing wells in all 12 fields, 2,323,680 total barrels of crude oil produced, 6,326 barrels per day total from all fields and wells, 4.78 barrels average per well per day.

The Federal code of fair competition for the petroleum industry was then in force and being administered under the supervision of the Secretary of the Interior. The Bureau of Mines had, in December 1933, allotted to Montana a producing oil quota of 6,060 barrels per day for all fields in the State, which allotment did not appear to take into consideration the fact that more than that amount was being used in the State of Montana and adjacent territory in Southern Alberta, Canada, and that the refineries in Montana had been obliged to import almost 1,000 barrels of crude daily from Wyoming during 1933. Protest was filed with the Petroleum Administrator which brought an increase of allowable quota to 6,800 barrels per day in January 1934, and periodical increases thereafter until a quota of 11,000 barrels per day had been reached by May 1935, when the national petroleum code was invalidated by the decision of the United States Supreme Court in the National Industrial Recovery Act case.

In January 1934, the oil conservation board adopted and promulgated its first regulations under the act approved December 29, 1933, and followed the regulations dated March 1, 1934, and September 20, 1934. See circulars numbered 1, 2, and 3, copies of which are submitted herewith. Said regulations did not provide any rules for controlling or limiting oil or gas production because the Board had no knowledge of, and no report or complaint before it alleging the existence of any physical waste, there were only a few oil producing wells in the State that were not necessarily classed as "stripper wells," and the actual market demand for crude petroleum produced in the State exceeded the visible or potential supply.

The board did not then, and has not up to this time, adopted and promulgated any rules or regulations governing the spacing of well locations, drilling of wells, or the casing, treatment, or plugging of wells for the reason that it was the apparent intent and purpose of the legislative assembly to leave authority concerning such matters in the State board of railroad commissioners, which is also the Public Service Commission of the State of Montana (see section 20 of the Oil Conservation Act of 1933 quoted on foregoing page 729 hereof) and the last named board had previously adopted and promulgated the rules and regulations promulgated by the Department of the Interior, Bureau of Mines, has its rules and regulations covering like operations. The members of the Oil Conservation Board at that time were entirely familiar with the Interior Department drilling and operating rules and regulations, considered them sufficient and satisfactory and would have adopted them for enforcement as to wells on fee and State-owned lands if the power had been delegated to them that then rested, and is now assumed to rest, in the State board of railroad commissioners. That situation stands unchanged at this date and I do not know that any State officer or any petroleum producers or well drillers object to it or desire any change.

The Oil Conservation Board has served the State and the petroleum producers, refiners, transporters, railroads, and public generally as a fact-finding agency and representative of the State's petroleum industries in connection with contacts and business with similar industries and governmental agencies in other States and Canada; it has aided and advised operators in connection with agreements and controversies pertaining to well spacing, pipe line and freight rates, crude oil markets, and has promptly considered all complaints filed with it whereby any waste of crude petroleum, either physical or economic, has been alleged.

The charges of physical waste of petroleum and charges of inefficient or unlawful drilling or casing practices have not been numerous and have usually been quickly and satisfactorily adjusted, with the assistance of representatives of the State board of railroad commissioners. Charges of economic waste have been made from time to time, usually emanating from the same group of oil producers who demand intervention of State authorities when unable to market their oil in satisfactory quantity or at satisfactory prices. Such complaints are difficult to adjust to the satisfaction of the complainants and in the absence of some legislation of an entirely new kind it would not be possible for any State agency to grant relief or do the things necessary to remedy such complaints.

The Oil Conservation Board records in January 1940, show that approximately 30,800,000 barrels of crude petroleum have been produced in Montana during the years 1934 to 1939 inclusive, or an average of 5,133,000 barrels per annum. Thirty million two hundred thousand barrels of that total have been marketed and 10,460,000 barrels of crude oil has been imported from Wyoming fields and processed at refineries located in southern Montana.

As evidence that there has not been any economic waste during those years I direct attention to the fact that crude oil in storage on December 31, 1934, was approximately 1,096,000 barrels, in the State, or approximately 4 months' supply based upon the average daily demand for Montana-produced crude in 1934. On December 31, 1939, we find approximately 1,316,500 barrels of Montana-produced crude oil in storage, which represented approximately 78 days' supply based upon average daily demand for Montana-produced crude in 1939.

It may be noted here that the demand in Montana for crude oil produced in the State has increased from approximately 4,000 barrels per day in 1934 to approximately 13,900 barrels per day in 1939. This increase was due to expansion of the oil-refining industries in Montana from a total of 22 plants having straight crude run capacity of 24,000 barrels per day to 35 active plants having straight crude run capacity of 38,000 barrels per day.

No new oil or gas fields of established commercial importance have been discovered in Montana since 1933, although some extensions of fields theretofore discovered have been added to areas being operated in 1933. The total number of completed wells producing, or capable of producing, crude oil has been increased to 1,703, of which 279 are located on lands owned by the Federal Government and Indians or Indian tribal organizations. The total number of natural gas wells producing and shut-in on December 31, 1939, was 550, at least one-third of which appear to be subject to Interior Department supervision. Exact number uncertain owing to incomplete title records covering some of the gas lands in the State.

A point that I wish to emphasize is that at least 20 percent of all of the producing oil and gas wells in Montana are subject to the exclusive jurisdiction of the Department of the Interior. As far as drilling, casing, and operating requirements, physical waste, and so forth, are concerned, and it must be assumed, and I am sure it is true, that everything done was in accordance with departmental regulations. Those identical regulations were adopted by the State agencies as to the remaining 80 percent of the oil and gas producing wells.

We do not know that the authors or supporters of H. R. 7372 charge, or that any of the officials of the Interior Department charge, that petroleum has been, or is being, wasted in Montana. We do not at present know of any reason for any such charge being made, but we are quite certain that it would be practically impossible for the producers in most of the fields of Montana to comply with the requirements set forth in subsection (3) of section 6 of the Cole bill. The enforcement of that section of the law would remove the possibility of exemption of any field in any State as a matter of law. The commissioner under the act could decide what he would accept as "concurrent and reasonably accurate determination" of the factors listed in subsection (c) of section 5 of the act. In other words, even though it be admitted that no charges of waste of petroleum in Montana at this time could be justified it is clear that we would have only 1 year after the effective date of the act within which our producers would have to do the impossible or else discontinue producing.

The average daily production of crude oil in Montana during 1939 was 16,326 barrels from 1,703 wells, or approximately 9 barrels per well per day. Natural gas production was approximately 19,000,000,000 cubic feet in 1938 (1939 figures are not yet available) for supplying cities, towns, and industries other than the oil-field operations. Production per well is variable and quite a large percentage of the 550 wells producing gas only were idle during most of last year and the year before.

Mr. Kelly. Mr. Jackson, you being a member of the Conservation Board in Montana, are you familiar with the Cut Bank field there?

Mr. Jackson. I was the secretary to the Board from the time it was created; yes, sir.

Mr. Kelly. Is there a great, an abundance of gas being constantly blown into the air there?

Mr. Jackson. Pardon me, I did not catch that.

Mr. Kelly. Is there an abundance of gas being blown into the air there?

Mr. Jackson. No; not wastefully. The Cut Bank field is composed of an area that produces gas almost exclusively over an enormous area, geographically speaking, and produces an enormous amount of gas that is being transported through the Montana Power Co.'s gas line to Butte, Anaconda, and other industrial centers of Montana, and to nearby smelters.

Mr. Kelly. What are your spacing requirements now for Montana?

Mr. Jackson. The only spacing requirement imposed by the Railroad Commission has been that no well closer to an outside property line than 220 feet may be drilled. And, the Federal Government rule on the same subject, as I understand it, is the same, that they will not approve any location on any Federal or Indian land that is nearer than 220 feet to the outside boundary of that tract unless the fee land owner or State land lessee has violated the State regulation. There has been no violation to my knowledge of that regulation. For more than 10 years past on fee or State-owned land and no violations of it on Federal land that I know of. That spaces the competing wells 440 feet apart through the field. The general custom in the newer parts of the fields is to space their inside locations either 330 or 440 feet apart and many of them are spaced 880 feet or more apart. As a whole it is a rather thinly drilled area. You will find in the Cut Bank field many areas where there are 320 acres with only one well located on the tract. And, it is the custom there to stay back from the outside property lines 660 feet.

Mr. Kelly. I believe that is all, Mr. Jackson. We thank you, sir.

Mr. Jackson. There is one thing that I will ask permission to add, that I feel should be said, and that is that the cooperation of the Bureau of Mines and the United States Geological Survey in Montana has been recognized and has been very much appreciated by the operators and the State authorities and the public generally. It has been satisfactory and helpful in every way. We have rather looked to those bureaus for guidance and leadership in the matter of conservation. Montana has always been an underproducing State and an area of small wells. That is as to oil. The gas production has come up very largely, but many of the oil operators have been of the stripper class. They have not had the training or the means to take advantage of all of the discoveries, of all of the engineering work done, that would inform them individually of particular conditions that affect some of our fields and enter into questions of conservation.

They are all interested very much, and they all go to the Federal Government or the State government agencies for advice and assistance, and the kind of cooperation we have had has tended to keep a check on the general situation. The fact that the Government has about 20 percent of the wells under its control and the State government the remaining 80 percent has created a situation where the field agents necessarily check on each other. If anything goes wrong on fee or State lands, the Government's agents supervising operations on the adjoining Federal land are usually aware of it, and if anything goes wrong on Federal land it is apt to be brought to the attention of the State authorities. That has worked very satisfactorily. There has been, of course, nothing compulsory about the cooperation except that the State public service commission has adopted the Federal rules and regulations for the sake of harmony in administration.

These lands of the Federal Government are so scattered through most of our oil and gas fields that there are numerous offsets and there is drainage both ways. Naturally the Federal agents are interested in how the State authorities control their lands and vice versa.

The system has worked well and in the public interest, in my opinion, and I have been in and associated with the oil and gas industries in the Northwest for some 20 or 25 years.

I think it is an ideal system. But under the Cole bill the regulation would apparently be something entirely different, and that is the reason for the protest against it, that is, it would remove that condition of joint or dual control and substitute what appears to be entirely Federal control.

I thank you.

Mr. KELLY. Thank you.

(The papers above referred to are as follows:)

REGULATIONS OF THE OIL CONSERVATION BOARD OF THE STATE OF MONTANA GREAT FALLS, MONTANA

GREAT FALLS, MONTANA, *January 22, 1934.*

To all producers, transporters, dealers in and/or storers of crude petroleum within the State of Montana:

Under the authority of the act of the Legislative Assembly of the State of Montana, approved December 29th, 2933 (H. B. #58; Chap. 18 Spl. Sess. Laws 1933–34), entitled: "An Act to Prohibit and Prevent the Waste of Crude Petroleum in the State of Montana, etc.," the following rules and regulations are prescribed for the administration of the provisions of said act required to be immediately enforced. It is an emergency act consistent in purposes and provisions with the Federal emergency laws enacted in 1933 providing for National control and regulation of oil production, and will remain in force only during the time that the Federal Code of Fair Competition for the Petroleum Industry shall remain legally effective.

A copy of said act is attached hereto. The Governor has duly appointed E. B. Coolidge and W. E. Rice, of Great Falls, Montana; C. J. Dousman, of Helena, Montana; L. B. O'Neil, of Cut Bank, Montana; and O. M. Webb, of Sunburst, Montana, members of the Oil Conservation Board as authorized by Section 2 of the act.

The Board has been organized, as required by Section 4 of the act; E. B, Coolidge has been elected Chairman and R. P. Jackson, of Great Falls, Montana, has been appointed Secretary of the Board.

The general effect of the act is to supplement and strengthen Montana's previously enacted laws relating to crude oil production, transportation, and storage during the period of the National emergency. It does not repeal or supplant any pre-existing laws, rules or regulations and must not be understood or construed to curtail, extend, modify or in any way affect any of the powers and duties of the State Board of Railroad Commissioners, Public Service Commission of the State or any other State body applicable to the industries and matters covered by said act under which these regulations are issued.

Until such time as conditions may require control and regulation of the State's oil production to the extent authorized by said act, which is, apparently, neither necessary nor desirable at this time, the Board will confine its activities to assembling and submitting to the National Oil Code Enforcement authorities at Washington, D. C., statistics and data relative to oil production in Montana; thereafter regularly assisting, and cooperating with, such authorities in determining and fixing allowable oil production within this state, as compared with reduction allowed in other states, to satisfy consumption demands within Montana and Western Canada, and allocating oil production between the various fields of the state as may be found necessary. These regulations will, therefore, be limited to the matters referred to in Section 5; Section 9, paragraph 4; Section 10; Section 14, and Section 15 of said act.

Every producer of crude petroleum in Montana is required to mail to the office of the Board, at Great Falls, Mont., on or before the 10th day of eve month, a report on Form A-1: 1934, entitled "Producer's Monthly Report of

Crude Oil Production and disposition," covering the next preceding calendar month. If no oil shall be produced during any month, the report must, nevertheless, be forwarded with statement noted thereon of that fact. Production in different fields must not be included in the same report form.

A copy of said form is attached hereto and a supply thereof will be promptly mailed to each producer.

Every producer of crude petroleum in Montana is required to mail to the State Treasurer of the State, at Helena, Montana, not later than the 20th day of each calendar month, beginning with the month of February, 1934 (to cover oil produced in January), a true statement, duly signed and sworn to, of all crude petroleum produced by him in Montana during the next preceding calendar month, on Form A–4: 1934, entitled: "Monthly Statement of Crude Petroleum Production and License Tax," at the same time mailing duplicate thereof to the office of this Board, and shall accompany such statement with the payment to the State Treasurer of the assessment provided for in Section 14 of the act in an amount equal to three-eighths of one per cent barrel for each barrel of crude petroleum produced by him within the state during the period covered by such report. Any producer carrying on business at more than one place or location in the state may include all such places of business in one statement. A copy of said form is attached hereto and a supply thereof will be promptly mailed to every producer of crude petroleum.

Every transporter of crude petroleum operating in the state, by pipe line, truck and/or rail, is required to mail to the office of the Board not later than the 10th day of each calendar month, a report on Form A–2:1934, entitled: "Transportation Agency's Monthly Report of Receipts and Disposition of Crude Oil," covering crude oil transported and/or stored during the next preceding calendar month. Separate reports must be made on oil handled from different fields. A copy of said form is attached hereto and supply thereof will be promptly mailed to every transporter and storer of crude oil.

Every refiner of crude petroleum in the state is required to mail to the office of the Board not later than the 10th day of each calendar month a report on Form A–3:1934, entitled: "Refiner's Monthly Report of Receipts and Disposition of Crude Oil," covering crude oil handled during the next preceding calender month. Oil produced in different fields may be included in one report. A copy of said form is attached hereto and supply thereof will be promptly mailed to every refiner of crude petroleum.

Attention is directed to the provisions of Section 18 of said act, in regard to penalties that may be imposed for failure to make and file the statements required by the act, in the manner and within the time required.

Very respectfully,

Oil Conservation Board of the State of Montana,
E. B. Coolidge, *Chairman.*
R. P. Jackson, *Secretary.*

AN ACT To prohibit and prevent the waste of crude petroleum in the State of Montana; creating an Oil Conservation Board; providing for the appointment of the members of said Board, providing the powers duties and authority of said Board and the members thereof! Providing for the filing and hearing of complaints concerning waste of crude petroleum, and for oaths, subpoenas and depositions; providing for the cooperation of said Board with the Government of the United States and Department or Bureau thereof in the administration and enforcement of the National Industrial Recovery Act and any order, rule, regulation or code, promulgated thereunder insofar as relates to the petroleum industry; providing for the enforcement of the act and the rules, regulations, and orders of the said Board and creating a fund for the purposes of said act and providing for the assessment and collection thereof.

Be It Enacted by the Legislative Assembly of the State of Montana:

Section 1. The production of crude petroleum in the State of Montana in such manner, under such conditions and in such amounts as to constitute or result in waste is hereby declared to be opposed to the public interest and is hereby prohibited.

Section 2. There is hereby created and established an Oil Conservation Board of the State of Montana to be known as "Oil Conservation Board of the State of Montana," said Board shall consist of five members to be appointed by the Governor, but may be removed by him at any time. They shall serve for two (2) years and until their successors are appointed and qualified, provided, however, that said Board shall be in existence only during such period as the Code of Fair Competition for the Petroleum Industry (approved by the President of the United States, August 19, 1933, or any amendments thereto or revisions thereof) shall be in effect, it being the intention that the life of said Board shall be coterminous with that of the Code of Fair Competition for the Petroleum Industry, or amendments thereto or revisions thereof. Any vacancy shall be filled by appointment in the manner prescribed by the Constitution.

Section 3. The persons appointed as members of such Board shall have been bona fide residents of the State of Montana for at least one year before such appointment, and four of whom shall be engaged in the production of crude petroleum within the State of Montana.

Section 4. The members of said Conservation Board first appointed shall without delay meet and organize and elect one of their members as Chairman. A majority of said Board shall constitute quorum. The members of the Conservation Board shall receive no compensation for their serivces but shall be allowed their several expenses incurred in the discharge of their duties.

Section 5. The Board may keep its office at the State Capitol or at any place in the State of Montana by it deemed best located for the performance of the duties imposed upon it by the provisions of this Act.

Meetings of said Conservation Board shall be at the call of the Chairman at any time and place he may designate. The Board may hold sessions or conduct hearings and investigate at any place it deems necessary to facilitate the performance of its duties or to accommodate parties in interest.

Section 6. The said Board may appoint a secretary and employ such other persons as experts, assistants, clerks, and stenographers, as may be necessary to perform the duties that may be required of it, and fix their compensation, provided, however, that the total expenditures of such Board shall not exceed in the aggregate during any fiscal year, the amount actually collected under the provisions of Section 14 of this Act.

The Secretary shall keep full and correct minutes of the transactions and proceedings of said Board and be the custodian of its records and files and preserve at the office of the Board all books, maps, and other documents entrusted to his care. He shall have authority to administer oaths and perform such other duties as may be required of him.

Section 7. The Board shall have a seal and such seal shall have the following words engraved thereon: "Oil Conservation Board of the State of Montana," and said seal shall be affixed to all writs, authentication of records, or other proceedings. The court of this state shall take judicial notice of such seal.

Section 8. Each member of said board and each person appointed to office by said Board before entering upon the duties of his office shall take and subscribe the oath specified in Section 1, Article 19, of the Constitution of the State of Montana and such oaths shall be filed in the office of the Secretary of State.

Section 9. The Conservation Board shall have general power and it shall be its duty:

1. To have general control, regulation and supervision of the production, transportation and storage of crude petroleum within the State of Montana.
2. To make and prescribe rules and regulations not inconsistent with the Constitution and Laws of the State of Montana which shall govern the operation of wells for the production of crude petroleum and the conservation thereof and the transportation and storage of crude petroleum within the State of Montana for the effectual carrying out of any and all laws, regulations and orders with regard to crude petroleum production, transportation and storage made by the United States Government or by the Department of the Interior of the United States of America, by the National Recovery Administration of the United States Government or by the authorities administering the Code of Fair Competition for the Petroleum Industry and/or any amendments thereof or any revision or modification thereof.
3. To determine and prescribe what producing wells shall be defined as "stripper wells," and to make such orders as in its judgment shall be required to protect said wells, and to provide that such wells may be produced to capacity if it is deemed necessary in the interest of conservation so to do, notwithstanding allocation or restriction of production of other wells.
4. To require each and every producer, transporter, dealer in and/or storer of crude petroleum within the state to furnish monthly, at least, and oftener if required by the Board, any and all information and reports to said Board on such forms as it may prescribe and within the time specified by the Board, regarding any and all of the activities of such producer, transporter, dealer in and/or storer with respect to his said operations.
5. To act as a regulatory board or agency for any allocation and regulation of crude petroleum production and/or storage within the State of Montana under and in accordance with the terms and provisions of the Code of Fair Competition for the Petroleum Industry or any amendments or revision thereof and to have full power and authority to carry out the provisions of said Code and to provide for the conforming thereto of all producers, transporters, dealers in and/or storers of crude petroleum within the State of Montana.

Section 10. Said Board shall have the right to require any producer or producers of such crude petroleum, or any operators of any drilling or producing well or wells, to make and file sworn statements of production of or facts concerning any well or wells under their control, whenever and as often and for such periods as it may specify, and such well or wells may be inspected by said Board and/or its representatives or agents, measured, tested and/or gauged and/or the production therefrom gauged in such manner and under such rules and regulations as may be prescribed by said Board.

Said Board shall likewise have the power to require owners and/or operators of any storage and/or transportation facilities of crude petroleum in this state to make and file such sworn statements regarding the same and quantity and quality of the crude petroleum in storage and/or transportation of crude petroleum in such manner and to such extent and at such time as shall be prescribed by said Board by rules and regulations or by specific order in the performance of its duties under this Act.

Section 11. Upon complaint of the Oil Conservation Board, or upon the verified complaint of any producer of crude petroleum in this state, if it shall appear to satisfaction of said Board, that waste as defined by the Code of Fair Competition or any amendment thereto and/or revision thereof of crude petroleum, is being committed in this state, or that any rules, regulation or order of the Board is being violated, it shall hold a hearing in each of the counties in which it is alleged that such waste is being committed, or that such violation is occurring, to determine whether or not such or any waste or violation is being committed. At least five (5) days prior to the date of said hearing the Board shall cause notice of the time and place of said hearing to be published in a newspaper of general circulation, printed and published in each county in which it is alleged that waste is being committed, or that such rules, regulations, or notice is being violated, or notice may be given by posting for at least five (5) days before such hearing in at least three conspicuous places in each field or locality in which it is alleged that such waste or violation is being committed; provided, however, that in lieu of notice by posting or by publication, personal service of such notice upon any person, firm, or corporation, at least five (5) days prior to the date of said hearing, shall be sufficient notice of such hearing to such person, firm, or corporation. Each member of the Oil Conservation Board and each representative of such Board appointed and designated may make investigations, conduct hearings and take testimony at any hearing provided for herein, and shall have power to administer oaths, take affidavits, and issue subpoenas for the attendance of witnesses at such hearing.

Section 12. If, upon the hearing, the Board finds that waste is being committed, and/or that any rule, regulation, or order of the Board, or the authorities administering the Code of Fair Competition or any amendments thereto or revisions thereof, in regard to the production, transportation, dealing in and/or storage of crude petroleum is being violated, it shall enter its order or orders requiring the person, firm, or corporation found to be committing such waste and/or violating such rule, regulation or order to desist from the same within such time and to the extent specified in such order or orders.

Section 13. If any person, firm, corporation, or syndicate shall violate or fail to comply with any order of the Board made hereunder, the said Board may bring an action by complaint in equity in the name of the State of Montana against such person, firm, corporation or syndicate in the district court of any county in which any of the property covered or affected by such order is situated and/or in any county such violation is alleged to have occurred to restrain the commission of such violation or compel compliance with any such order. There may be joined in the same proceeding any number of defendants alleged to be violating the same order, although their properties and interests may be severally owned or may be situated in several counties and their actual violations of the order may be separate and distinct. In such action the court may enjoin the defendant or defendants from violating said order or may find to what extent violation has been committed and enter judgment accordingly. In the event the order is determined to be invalid the court may dismiss said action without prejudice to the right and jurisdiction to conduct further hearings and make a new order in the premises by giving notice thereof as in this Act provided. In any action for injunction brought hereunder no restraining order shall be issued exparty but otherwise the proceedings shall be governed by the provisions of the Code of Civil Procedure of the State of Montana and pending appeal no temporary or permanent injunction issued in such proceeding shall be refused or dissolved or stayed upon the giving of any bond or undertaking or otherwise.

Section 14. There is hereby levied and assessed a privilege and license tax of three-eighths of one cent per barrel on each and every barrel of crude petroleum produced, saved and marketed or stored within the State of Montana, during the period during which said Board is in existence. Producers thereof shall pay such tax on each barrel of crude petroleum produced for themselves as well as for others including royalty holders and shall be reimbursed for such tax paid on crude oil produced for others in the same manner as they are reimbursed for Net Proceeds Tax paid on crude petroleum produced for others as provided in Chapter 161 of the Session Laws of the Twenty-third Legislative Assembly of the State of Montana.

Section 15. Each producer of crude petroleum in the State of Montana shall, not later than the 20th day of each calendar month, beginning with the next calendar month after this Act shall become effective, render a true statement to the State Treasurer of the State of Montana, and a duplicate thereof to the Conservation Board of the State of Montana, duly signed and sworn to, of all crude petroleum produced by him in this State, during the preceding month, and containing such other information as the Oil Conservation Board may require, and shall accompany such statement with the payment to the State Treasurer of the assessment provided for in Section 14 of this Act in an amount equal to three-eighths of one cent per barrel for each barrel of crude petroleum produced by him within the state during the period covered by such report. Any producer carrying on business at more than one place or location in this state may include all such places of business in one statement.

Section 16. Any such assessment not paid within the time herein specified shall be delinquent, and a penalty of twenty-five percent (25%) thereof shall be added thereto and the whole thereof shall bear interest at the rate of one percent (1%) per month from the date of delinquency until paid.

Upon request of the Oil Conservation Board it shall be the duty of the Attorney General to commence and prosecute to final determination in any court of competent jurisdiction an action at law to collect the same.

Section 17. All money collected under the provisions of this Act shall be deposited in a special fund to be known as the "Oil Conservation Board Fund" by the State Treasurer of the State of Montana, and the fund to be raised shall be used for the purpose of paying all expenses of said Board and for no other purpose. Upon the termination of said Board any balance remaining in said fund shall be paid over to the general fund of the state.

All accounts and expenditures of said Board shall be certified by the said Oil Conservation Board approved by the Board of Examiners, and paid by the State Treasurer upon warrants drawn by the State Auditor out of the Oil Conservation Board Fund.

Section 18. Each person, firm, copartnership, corporation, or syndicate who fails, neglects or refuses to make and file the statements required by this Act in the manner and within the time required, or shall wilfully make any false statement with reference to its, or his, business or shall wilfully violate any order of said Board shall be deemed guilty of a misdemeanor, and upon conviction thereof shall be fined in an amount not exceeding One Thousand Dollars ($1,000) or punished by imprisonment in the county jail for not to exceed six months, or by both such fine and imprisonment, and in the case of a corporation such punishment may also include forfeiture of its authorization to transact business within the State of Montana.

Section 19. If any section, subsection, sentence, clause or phrase of this Act is for any reason held unconstitutional, such decision shall not affect the validity of the remaining portions of this Act. The Legislative Assembly declares that it would have passed this Act and each section, sentence, clause and phrase thereof irrespective of the fact that any one or more sections, subsections, sentences, clauses or phrases be declared unconstitutional.

Section 20. Nothing herein contained shall be construed to derogate any powers of the Board of Railroad Commissioners of the State of Montana or the Public Service Commission of the State of Montana.

Section 21. This Act shall be in full force and effect from and after its passage and approval.

Approved December 29th, 1933.

REGULATIONS OF THE OIL CONSERVATION BOARD OF THE STATE OF MONTANA, REVISED TO OCTOBER 31, 1939

To all producers, transporters, dealers in and/or stores of crude petroleum within the State of Montana:

Under the authority of the act of the Legislative Assembly of the State of Montana, approved December 29, 1933, chapter 18, extraordinary session laws 1933–34 as amended to March 31, 1937, the following rules and regulations are prescribed for the administration of the provisions of said act required to be enforced at the present time and until further notice. A copy of the law is attached hereto.

The duly appointed, qualified, and acting members of the board are L. B. O'Neil and Wilfred F. Nadeau of Cut Bank, Mont.; W. E. Rice of Great Falls, Mont.; George R. Downs of Shelby, Mont.; and Tom Stout of Lewiston, Mont. The elected and appointed officers of the board are L. B. O'Neil, chairman; W. E. Rice, vice chairman; and R. P. Jackson of Great Falls, secretary.

Pursuant to the provisions of section 9 of said act:

1. Every producer of crude petroleum in Montana is required to mail to the office of the board, at Great Falls, Mont., on or before the 20th day of every calendar month, a report on Form A–1: 1934, entitled "Producer's Monthly Report of Crude Oil Production and Disposition," covering the next preceding calendar month. If no oil shall be produced during any month, the report must nevertheless, be forwarded with statement noted thereon of that fact. Production in different fields must not be included in the same report form.

2. Every producer of crude petroleum in Montana is required to mail to the board, not later than the last day of each of the calendar months of January, April, July, and October, of each and every calendar year, a true statement, in duplicate, duly signed and sworn to, of all crude petroleum produced by him in Montana during the next preceding 3 calendar months and containing such other information as indicated on Form A–4; amended 1937, entitled: "Statement to the State Treasurer of Crude Petroleum Production and License Tax." All such statements must be accompanied by remittance of the sum of money equal to one-fourth of 1 cent per barrel for each and every barrel of crude petroleum produced and saved for market during the period covered by the statement, less credits for tax exempt oil that may be lawfully allowed by the board. All remittances should be made payable to "State treasurer" and attached to said statement as filed with the oil conservation board. The secretary of the board is authorized to audit all statements and make deposit of remittances to the bank account of the State treasurer. On account of the practical impossibility of ascertaining the exact amount of crude petroleum produced from any leased premises as distinguished from water and/or other substances almost always commingled therewith as extracted from wells, during any stated period of time, until the crude petroleum has been separated from any associated substances to the extent necessary for its acceptance as "pipe line oil," the board has interpreted the law to permit the producer to report on said Form A–4 as taxable only the crude petroleum that has been, during the period covered by the statement, transported from the land where produced, either by pipe line or truck. In other words "crude petroleum produced," as stated in section 15 of the act, is identified and the quantity fixed by the acceptance thereof by a transporter and its removal from any and all wells or tanks on the premises where produced, consequently the tax must be assessed as of date of such removal and the amount due must be paid at the end of the quarter, regardless of the ownership of the oil after removal from the premises and whether or not held in storage elsewhere pending sale or payment of the purchase price to the producer.

3. Every transporter of crude petroleum operating in the State, by pipe line and/or truck, is required to mail to the office of the board not later than the 20th day of each calendar month a report on Form A–2: 1934, which is entitled: "Transportation Agency's Monthly Report of Receipts and Disposition of Crude Oil," showing crude petroleum received, transported, delivered to others, and/or stored by the transporter during the next preceding calendar month. Separate report is required as to crude petroleum transported from each field.

4. Storers of, or dealers in, crude petroleum who neither produce, transport, nor refine crude petroleum, are required to make report each month of crude petroleum added to storage and/or delivered out of storage on the same form (A–2) and at the same time prescribed for transporters (see par. "2" above).

5. Every refiner of crude petroleum in the State is required to mail to the office of the board not later than the 20th day of each calendar month a report on Form A–3: 1934, entitled: "Refiner's Monthly Report of Receipts and Disposi-

tion of Crude Oil," showing the crude petroleum received, refined, stored, etc., during the next preceding calendar month. Oil produced in different fields may be included in one report, separately, as indicated in the form.

Supplies of any and all forms will be furnished by the board, free of charge, promptly after receipt of request.

Attention is directed to the provisions of sections 16 and 18 of the law (see secs. 3554.16 and 3554.18, Revised Codes of Montana, 1935), regarding penalties for failure to timely pay the tax and or to make and timely file the reports in these regulations specified.

OIL CONSERVATION BOARD OF THE STATE OF MONTANA,
L. B. O'NEIL, *Chairman.*
R. P. JACKSON, *Secretary.*

RESOLUTIONS OF THE OIL CONSERVATION BOARD OF THE STATE OF MONTANA, GREAT FALLS, MONT.

Be It Resolved; That we, the members of the Oil Conservation Board of the State of Montana, duly appointed by the Honorable Roy E. Ayers, Governor of the State of Montana, in meeting regularly called and held at Cut Bank, Mont., on the 30th day of October A. D. 1939, having considered the bill generally known and referred to as the "Petroleum Conservation Act of 1939" (H. R. 7372), which was introduced in the House of Representatives of the Congress of the United States on July 26, 1939, by Mr. Cole of Maryland, do hereby declare that we are unalterably opposed to the enactment of said bill upon the grounds and for the reasons, to wit:

1. The concentration of power at Washington, D. C., to control and manage the production, storage, and transportation of petroleum throughout the United States, in an individual to be appointed by the President and designated "The Commissioner," but to be clothed with complete dictatorial power as set forth in H. R. 7372, is not now justified by the conditions and practices generally prevailing in the petroleum producing States, and we believe that at any time and under any circumstances the subordination of the soverign powers of the States over their petroleum industries to Federal authority such as proposed by the terms of said H. R. 7372 would be a hazardous experiment in government, more likely to weaken than to strengthen the Nation by reason of destruction of long-established and efficient local control measures and agencies, the substitution of remote authority and new methods of uncertain value, additional enforcement officials, increased taxes, conflicting and confusing regulations, and additional burdens generally that many operators and consumers could not endure.

2. The allegations contained in said H. R. 7372 under the heading "Findings and declaration of policy" (sec. 2 (a)), are not substantially true and correct as to a large majority of the petroleum producing regions of the United States and, on the contrary, there is no doubt that preventable physical waste of petroleum has been reduced to the minimum consistent with present engineering knowledge and perfection of mechanical appliances except in a comparatively few isolated cases involving newly discovered pools where abnormal conditions prevailing are in process of adjustment and will, undoubtedly, be soon corrected without the intervention of the Federal Government.

3. The Nation is not faced with any emergency in connection with the preservation of its petroleum resources whereby its national defense, is, or will be, imperiled and if it were we contend that there is no reason for assuming or expecting that the system of Federal-dictator control proposed in H. R. 7372 would remove the danger or solve the problems of the petroleum producers. In the public-land States where the Secretary of the Interior has enjoyed and exercised unrestricted regulatory powers over petroleum prospecting and producing operations on great areas of public lands for nearly 20 years past, such operations being entirely exempt from control by State authorities, the practices pertaining to well drilling, producing, and avoidance of waste prescribed by the Secretary for operators and operations on the lands under his jurisdiction are generally identical with the practices prescribed by State laws and regulations for operators and operations subject to State authority. If the practices may be improved by ways and means known to the Secretary he need do nothing more than point the way to receive the cooperation and support of the operators and State authorities.

4. The practices and methods pertaining to petroleum prospecting, production and conservation of deposits generally approved and now prevailing throughout the country have been devised and adopted by men possessing the practical experience necessary to qualify them as leaders and teachers concerning such

matters. Such men are scarce, they may be expected to resent arbitrary control from any source, and it is not likely that their services would be available to the Federal dictator to be created. Progress in the discovery of new principles and improvement of mechanical appliances and operating practices has been rapid and gratifying under our long-established competitive system, especially during the last few years, and may reasonably be expected to continue if not balked or disturbed by the inauguration of a dictatorship system entirely alien to our general governmental system and under which the public could have no assurance that individual enterprise, initiative, and experiment might remain active or even be permitted to survive.

5. The administrative, punitive, and jurisdictional sections of the bill, comprising nearly half of the 6,000 words it contains, are in general so violative of long standing laws and judicial procedure intended to protect individuals against official tyranny and errors that it is difficult to see how the representatives of freedom loving people could seriously consider approving them. Perhaps some of the most repugnant clauses were inserted with the view of bing "traded out" by supporters of the bill in the course of the expected and assured legislative battle and if so, we hope and recommend that our lawmakers may not be deceived by such tactics and will promptly move to give this bill the defeat that it deserves; and, be it further hereby

Resolved, That the secretary of this board is hereby directed to mail copies hereof to the President of the United States; the Senators and Congressmen representing the State of Montana at Washington, D. C.; the chairman of the House Committee on Interstate and Foreign Commerce who will preside over the public hearings on H. R. 7372; the Governor of Montana; all other Federal and State officials who might be interested, representatives of the press, trade associations, and each and every oil producer, transporter, refiner, and storer operating in the State of Montana.

CERTIFICATE

I hereby certify that this sheet and the foregoing sheets, numbered "1" and "2," attached hereto, contain a full, true, and correct copy of resolutions adopted by the Oil Conservation Board of the State of Montana.

In witness whereof, I have hereunto set my hand and the official seal of said board on this 30th day of November, A. D., 1939, at my office in Great Falls, Mont.

[OFFICIAL SEAL] R. R. JACKSON,
Secretary of the Oil Conservation Board of the State of Montana.

STATE OF MONTANA

OIL CONSERVATION LAW: CHAPTER 18, EXTRAORDINARY SESSION LAWS, 1933–1934, AS AMENDED TO MARCH 31, 1937

AN ACT To prohibit and prevent the waste of crude petroleum in the State of Montana; creating an oil conservation board; providing for the appointment of the members of said board, providing the powers, duties and authority of said board and the members thereof; providing for the filing and hearing of complaints concerning waste of crude petroleum, and for oaths, subpenas and depositions; providing for the cooperation of said board with the Government of the United States and department or bureau thereof in the administration and enforcement of the National Industrial Recovery Act and any order, rule, regulation or code, promulgated thereunder insofar as relates to the petroleum industry; providing for the enforcement of the act and the rules, regulations, and orders of the said board and creating a fund for the purposes of said act and providing for the assessment and collection thereof. (Approved December 29, 1933.)

Be it enacted by the legislative assembly of the State of Montana:

SECTION 1. The production of crude petroleum in the State of Montana in such manner, under such conditions and in such amounts as to constitute or result in waste is hereby declared to be opposed to the public interest and is hereby prohibited. (See sec. 3554.1, R. C. of Montana, 1935.)

SEC. 2. There is hereby created and established an Oil Conservation Board of the State of Montana to be known as Oil Conservation Board of the State of Montana; said board shall consist of five members to be appointed by the Governor, but may be removed by him at any time. They shall serve for 2 years and until their successors are appointed and qualified: *Provided, however*, That any vacancy shall be filled by appointment in the manner prescribed by the constitution. (See sec. 3554.2, R. C. of Montana, 1935.)

SEC. 3. The persons appointed as members of such board shall have been bona fide residents of the State of Montana for at least 1 year before such appointment, and 4 of whom shall be engaged in the production of crude petroleum within the State of Montana. (See sec. 3554.3, R. C. of Montana, 1935.)

SEC. 4. The members of said conservation board first appointed shall without delay meet and organize and elect one of their members as chairman. A majority of said board shall constitute a quorum. The members of the conservation board shall receive no compensation for their services but shall be allowed their several expenses incurred in the discharge of their duties. (See sec. 3554.4, R. C. of Montana, 1935.)

SEC. 5. The board may keep its office at the State capitol or at any place in the State of Montana by it deemed best located for the performance of the duties imposed upon it by the provisions of this act.

Meetings of said conservation board shall be at the call of the chairman at any time and place he may designate. The board may hold sessions or conduct hearings and investigate at any place it deems necessary to facilitate the performance of its duties or to accommodate parties in interest. (See sec. 3554.5, R. C. of Mont., 1935.)

SEC. 6. The said board may appoint a secretary and employ such other persons as experts, assistants, clerks, and stenographers, as may be necessary to perform the duties that may be required of it, and fix their compensation: *Provided, however,* That the total expenditures of such board shall not exceed in the aggregate during any fiscal year, the amount actually collected under the provisions of section 14 of this act.

The secretary shall keep full and correct minutes of the transactions and proceedings of said board and be the custodian of its records and files and preserve at the office of the board all books, maps, and other documents entrusted to his care. He shall have authority to administer oaths and perform such other duties as may be required of him. (See sec. 3554.6, R. C. of Mont., 1935.)

SEC. 7. The board shall have a seal and such seal shall have the following words engraved thereon: "Oil Conservation Board of the State of Montana," and said seal shall be affixed to all writs, authentication of records or other proceedings. The courts of this State shall take judicial notice of such seal. (See sec. 3554.7, R. C. of Mont., 1935.)

SEC. 8. Each member of said board and each person appointed to office by said board, before entering upon the duties of his office shall take and subscribe the oath specified in section 1, article 19, of the constitution of the State of Montana and such oaths shall be filed in the office of the secretary of state. (See sec. 3554.8, R. C. of Montana, 1935.)

SEC. 9. The conservation board shall have general power and it shall be its duty:

1. To have general control, regulation, and supervision of the production, transportation and storage of crude petroleum within the State of Montana.
2. To make and prescribe rules and regulations, not inconsistent with the constitution and laws of the State of Montana, which shall govern the operation of wells for the production of crude petroleum and the conservation thereof and the transportation and storage of crude petroleum within the State of Montana for the effectual carrying out of any and all laws, regulations and orders with regard to crude petroleum production, transportation and storage made by the United States Government, or by the Department of the Interior of the United States of America, by the National Recovery Administration of the United States Government, or by the authorities administering the Code of Fair Competition for the Petroleum Industry and/or any amendments thereof or any revision or modification thereof.
3. To determine and prescribe what producing wells shall be defined as "stripper wells," and to make such orders as in its judgment shall be required to protect said wells, and to provide that such wells may be produced to capacity if it is deemed necessary in the interest of conservation so to do, notwithstanding allocation or restriction of production of other wells.
4. To require each and every producer, transporter, dealer in and/or storer of crude petroleum within the State to furnish monthly, at least, and oftener if required by the board, any and all information and reports to said board on such forms as it may prescribe and within the time specified by the board, regarding any and all of the activities of such producer, transporter, dealer in and/or storer with respect to his said operations.
5. To act as a regulatory board or agency for any allocation and regulation of crude petroleum production and/or storage within the State of Montana under and in accordance with the terms and provisions of the Code of Fair Competition for the Petroleum Industry or any amendments or revision thereof, and to have full power and authority to carry out the provisions of said Code and to provide for the conforming thereto of all producers, transporters, dealers in and/or storers of crude petroleum within the State of Montana. (See sec. 3554.9, R. C. of Mont., 1935.)

Sec. 10. Said board shall have the right to require any producer or producers of such crude petroleum, or any operators of any drilling or producing well or wells, to make and file sworn statements of production of or facts concerning any well or wells under their control, whenever and as often and for such periods as it may specify, and such well or wells may be inspected by said board and/or its representatives or agents, measured, tested and/or gauged and/or the production therefrom gauged in such manner and under such rules and regulations as may be prescribed by said board.

Said Board shall likewise have the power to require owners and/or operators of any storage and/or transportation facilities of crude petroleum in this State to make and file such sworn statements regarding the same and quantity and quality of the crude petroleum in storage and/or transportation of crude petroleum in such manner and to such extent and at such time as shall be prescribed by said Board by rules and regulations or by specific order in the performance of its duties under this Act. (See Sec. 3554.10, R. C. of Mont., 1935.)

Sec. 11. Upon complaint of the oil conservation board, or upon the verified complaint of any producer of crude petroleum in this State, if it shall appear to satisfaction of said board, that waste as defined by the Code of Fair Competition or any amendment thereto and/or revision thereof of crude petroleum, is being committed in this State, or that any rules, regulation or order of the board is being violated, it shall hold a hearing in each of the counties in which it is alleged that such waste is being committed, or that such violation is occurring, to determine whether or not such, or any, waste or violation is being committed. At least 5 days prior to the date of said hearing the board shall cause notice of the time and place of said hearing to be published in a newspaper of general circulation, printed and published in each county in which it is alleged that waste is being committed, or that such rules, regulations, or notice is being violated, or notice may be given by posting for at least 5 days before such hearing in at least three (3) conspicuous places in each field or locality in which it is alleged that such waste or violation is being committed; provided, however, that in lieu of notice by posting or by publication. personal service of such notice upon any person, firm, or corporation, at least five (5) days prior to the date of said hearing, shall be sufficient notice of such hearing to such person, firm, or corporation. Each member of the Oil Conservation Board and each representative of such Board appointed and designated may make investigations, conduct hearings and take testimony at any hearing provided for herein, and shall have power to administer oaths, take affidavits and issue subpoenas for the attendance of witnesses at such hearing. (See Sec. 3554.11, R. C. of Mont., 1935.)

Sec. 12. If, upon the hearing, the board finds that waste is being committed, and/or that any rule, regulation, or order of the board, or the authorities administering the code of fair competition or any amendments thereto or revisions thereof, in regard to the production, transportation, dealing in, and/or storage of crude petroleum is being violated, it shall enter its order or orders requiring the person, firm, or corporation found to be committing such waste and/or violating such rule, regulation, or order to desist from the same within such time and to the extent specified in such order or orders. (See sec. 3554.12, R. C. of Mont., 1935.)

Sec. 13. If any person, firm, corporation, or syndicate shall violate or fail to comply with any order of the board made hereunder, the said board may bring an action by complaint in equity in the name of the State of Montana against such person, firm, corporation, or syndicate in the district court of any county in which any of the property covered or affected by such order is situated and/or in any county such violation is alleged to have occurred to restrain the commission of such violation or compel compliance with any such order. There may be joined in the same proceeding any number of defendants alleged to be violating the same order, although their properties and interests may be severally owned or may be situated in several counties and their actual violations of the order may be separate and distinct. In such action the court may enjoin the defendant, or defendants, from violating said order or may find to what extent violation has been committed and enter judgment accordingly. In the event the order is determined to be invalid the court may dismiss said action without prejudice to the right and jurisdiction to conduct further hearings and make a new order in the premises by giving notice thereof as in this act provided. In any action for injunction brought hereunder no restraining order shall be issued ex-party, but otherwise the proceedings shall be governed by the provisions of the Code of Civil Procedure of the State of Montana, and pending appeal, no temporary or permanent injunction issued in such proceeding shall be refused or dissolved or stayed upon the giving of any bond or undertaking or otherwise. (See sec. 3554.13, R. C. of Mont., 1935.)

SEC. 14. There is hereby levied and assessed a privilege and license tax of one-fourth of 1 cent per barrel on each and every barrel of crude petroleum produced, saved, and marketed or stored within the State of Montana, during the period during which said board is in existence. Producers thereof shall pay such tax on each barrel of crude petroleum produced for themselves as well as for others including royalty holders and shall be reimbursed for such tax paid on crude oil produced for others in the same manner as they are reimbursed for net proceeds tax paid on crude petroleum produced for others as provided in section 2091.1 of the Revised Codes of Montana of 1935. (See sec. 3554.14, R. C. of Mont., 1935, as amended by chap. 123, sess. laws, 1937.)

SEC. 15. Each producer of crude petroleum in the State of Montana shall, not later than the last day of each of the calendar months of January, April, July, and October of each and every calendar year, beginning with the month of July of the year one thousand nine hundred and thirty-seven, render a true statement to the State treasurer of the State of Montana, and a duplicate thereof to the Oil Conservation Board of the State of Montana, duly signed and sworn to, of all crude petroleum produced by him in this State during the next preceding 3 calendar months, and containing such other information as the oil conservation board may require, and shall accompany such statement with the payment to the State treasurer of the assessment provided for in section 3554.14 of the Revised Codes of Montana of 1935 in an amount equal to one-fourth of 1 cent per barrel for each barrel of crude petroleum produced by him within the State of Montana during the period covered by such statement. Any producer carrying on business at more than one place or location in this State may include all such places of business in one statement. (See sec. 3554.15, R. C. of Mont., 1935, as amended by chap. 123, sess. laws, 1937.)

SEC. 16. Any such assessment not paid within the time herein specified shall be delinquent, and a penalty of 25 percent thereof shall be added thereto, and the whole thereof shall bear interest at the rate of 1 percent per month from the date of delinquency until paid.

Upon request of the oil conservation board it shall be the duty of the attorney general to commence and prosecute to final determination in any court of competent jurisdiction an action at law to collect the same. (See sec. 3554.16, R. C. of Mont., 1935.)

SEC. 17. All money collected under the provisions of this act shall be deposited in a special fund to be known as the oil conservation board fund by the State Treasurer of the State of Montana, and the fund to be raised shall be used for the purpose of paying all expenses of said board and for no other purpose. Upon the termination of said board any balance remaining in said fund shall be paid over to the general fund of the State.

All accounts and expenditures of said board shall be certified by the said Oil Conservation Board approved by the board of examiners, and paid by the State Treasurer upon warrants drawn by the State auditor out of the oil conservation board fund. (See sec. 3554.17, R. C. of Mont., 1935.)

SEC. 18. Each person, firm, copartnership, corporation, or syndicate who fails, neglects, or refuses to make and file the statements required by this act in the manner and within the time required, or shall wilfully make any false statement with reference to its, or his, business or shall wilfully violate any order of said board shall be deemed guilty of a misdemeanor, and upon conviction thereof, shall be fined in an amount not exceeding $1,000, or punished by imprisonment in the county jail for not to exceed six (6) months, or by both such fine and imprisonment, and in the case of a corporation such punishment may also include forfeiture of its authorization to transact business within the State of Montana. (See sec. 3554.18, R. C. of Mont., 1935.)

SEC. 19. If any section, subsection, sentence, clause, or phrase of this act is for any reason held unconstitutional, such decision shall not affect the validity of the remaining portions of this act. The legislative assembly declares that it would have passed this act and each section, sentence, clause, and phrase thereof irrespective of the fact that any one or more sections, subsections, sentences, clauses, or phrases be declared unconstitutional.

SEC. 20. Nothing herein contained shall be construed to derogate any powers of the Board of Railroad Commissioners of the State of Montana or the Public Service Commission of the State of Montana. (See sec. 3554.19, R. C. of Mont., 1935.)

SEC. 21. This act shall be in full force and effect from and after its passage and approval. (Approved Dec. 29, 1933.)

REGULATIONS OF THE OIL CONSERVATION BOARD OF THE STATE OF MONTANA

MARCH 1, 1934.

To all producers, transporters, dealers in and/or storers of crude petroleum within the State of Montana:

At a meeting of the board held on February 26, 1934, regulations promulgated under circular No. 1 dated January 22, 1934, were amended and modified to the extent that every producer of crude petroleum in Montana is required to mail to the office of the board at Great Falls, on or before the 20th day of every calendar month, a report on Form A-1, 1934, entitled "Producer's Monthly Report of Crude Oil Produced and Disposition," covering the last preceding calendar month. It will be noted that the only change in said regulations is the postponement of the date that said report becomes due from the 10th to the 20th of each month, such change being made in deference to the wishes of a large number of producers who insisted that it would be virtually impossible for them to obtain the data required to be set forth in said report prior to the 15th day of each month.

At the same meeting the board defined "stripper wells" by adoption of a resolution reading as follows:

"*Be it resolved*, That the Oil Conservation Board of the State of Montana, in meeting duly assembled and in the exercise of the authority vested in it by virtue of the terms of paragraph 3, section 9, of the act of the Montana Legislative Assembly approved December 29, 1933 (ch. 18, Spl. Sess. Laws 1933-34), does hereby determine, prescribe, and define as stripper wells in the State of Montana all wells on any lease having daily average production of oil per well on said lease of the certain amount, or amounts, to wit:

"Ten barrels if the depth of well, or average depth of wells, on lease does not exceed 1,500 feet.

"Fifteen barrels if the depth of well, or average depth of wells, on lease exceeds 1,500 feet and does not exceed 2,000 feet.

"Twenty barrels if the depth of well, or average depth of wells, on lease exceeds 2,000 feet and does not exceed 2,500 feet.

"Thirty barrels if the depth of well, or average depth of wells, on lease exceeds 2,500 feet and does not exceed 3,000 feet.

"Forty barrels if the depth of well, or average depth of wells, on lease exceeds 3,000 feet and does not exceed 4,000 feet.

"Fifty barrels if the depth of well, or average depth of wells, on lease exceeds 4,000 feet.

"Provided, that unusual conditions in specific instances may be reviewed by the board upon application and the board hereby reserves the right to determine, prescribe, and define certain wells to be 'stripper wells' regardless of the above stated general definition of 'stripper wells.'"

The board defined "isolated" oil wells, referred to in the code of fair competition of the petroleum industry, by adoption of a resolution reading as follows:

"*Be it resolved*, That the Oil Conservation Board of the State of Montana, in meeting duly assembled and in the exercise of the authority vested in it by virtue of the provisions of the Act of the Montana Legislative Assembly approved December 29, 1933 (ch. 18, Spl. Sess. Laws 1933-34), does hereby determine, prescribe, and define as 'isolated' oil wells any well operated by power not connected with any other well and the operator of which does not operate any other producing oil well located less than one-fourth of 1 mile therefrom."

Very respectfully,

OIL CONSERVATION BOARD
OF THE STATE OF MONTANA,
E. B. COOLIDGE, *Chairman.*
R. P. JACKSON, *Secretary.*

REGULATIONS OF THE OIL CONSERVATION BOARD OF THE STATE OF MONTANA

SEPTEMBER 20, 1934.

To all producers, transporters, dealers in and/or storers of crude petroleum within the State of Montana:

At a meeting of the board held on September 19, 1934, regulations promulgated under Circular No. 2 dated March 1, 1934, were amended and modified to the extent that the definition of "stripper wells" was changed by adoption of a resolution reading as follows:

"*Be it resolved*, That the Oil Conservation Board of the State of Montana, in meeting duly assembled and in the exercise of the authority vested in it by virtue of the terms of paragraph 3, section 9, of the act of the Montana Legislative Assembly approved December 29, 1933 (ch. 18, Spl. Sess. Laws 1933–34) does hereby determine, prescribe, and define as 'stripper wells' in the State of Montana all wells on any lease having daily average production of oil per well on such lease of the certain amount, or amounts, to wit:

"Five barrels or less if the depth of well, or average depth of wells, on the lease does not exceed 1,750 feet.

"Seven and one-half barrels or less if the depth of well, or average depth of wells, on lease exceeds 1,750 feet and does not exceed 2,250 feet.

"Ten barrels or less if the depth of well, or average depth of wells, on lease exceeds 2,250 feet and does not exceed 2,750 feet.

"Fifteen barrels or less if the depth of well, or average depth of wells, on lease exceeds 2,750 feet and does not exceed 3,250 feet.

"Twenty barrels or less if the depth of well, or average depth of wells, on lease exceeds 3,250 feet and does not exceed 4,000 feet.

"Twenty-five barrels or less if the depth of well, or average depth of wells, on lease exceeds 4,000 feet.

"Provided, that unusual conditions in specific instances may be reviewed by the board upon application and the board hereby reserved the right to determine, prescribe, and define certain wells to be 'stripper wells' regardless of the above-stated general definition of such wells."

Very respectfully,

OIL CONSERVATION BOARD
OF THE STATE OF MONTANA,
E. B. COOLIDGE, *Chairman.*
R. P. JACKSON, *Secretary.*

TO THE HONORABLE, THE SUBCOMMITTEE OF THE COMMITTEE ON INTERSTATE AND FOREIGN COMMERCE, NOW HAVING UNDER CONSIDERATION H. R. 7372, KNOWN AS THE COLE BILL—BRIEF ON BEHALF OF THE MONTANA OIL CONSERVATION COMMISSION

Prepared by Roy E. Ayers, Governor of Montana; R. P. Jackson, secretary, Montana Oil Conservation Board; William A. Weber, attorney at law

WASHINGTON, D. C., *February 17, 1940.*

To the Honorable William P. Cole, Jr., Chairman, and Members of the Subcommittee;

We shall not take the time of this committee by going into an extended discussion of the merits or demerits of the cause that prompted the introduction of this bill; that purpose has already been amply discussed before the committee. Our purpose in this brief is to discuss H. R. 7372 from strictly a legal point of view and with that in mind we will confine ourselves to the history and the ultimate judicial adjudication of this class of legislation.

Suffice it to say that similar legislation was introduced in the Seventy-second Congress, known as the Marland-Capper bill—it having been introduced in both the Senate and the House. It was rejected by the House Ways and Means Committee and also by the Senate Finance Committee, however, most of the provisions of that bill became a part of the National Industrial Recovery Act, which was later declared unconstitutional by the Supreme Court of the United States.

However, the provisions of the National Industrial Recovery Act on the subject here under consideration did one material thing which this bill does not do, namely, it permitted the shipment in both interstate and foreign commerce of oil and oil products produced and withdrawn from storage in pursuance of State law and valid State orders; hence, we must emphasize the fact that that act recognized the rights of States which the instant act does not do. The only logical conclusion to draw in such instance is that if the then act was judicially bad, this one must be also.

The legal aspect of this bill, as we shall discuss it, is: Does Congress have constitutional authority to place control of the production of petroleum, within the States, under its power to regulate interstate and foreign commerce or under its power to provide for the national defense? Such is the position of the bill, as set forth in the declarations of its policy. Of course, this committee is mindful that "declarations of policy" do not enlarge upon the text of the bill nor does it add to the constitutional rights of Congress. Congress must get its right from the Constitution and not from any declaration of its own.

Railroad Retirement Board v. *Alton R. R. Co.* (295 U. S. 70 L. Ed. 1468).

U. S. v. *Butler* (297 U. S. 1, 80 L. Ed. 477).

Carter v. *Carter Coal Co.* (298 U. S. 238, 80 L. Ed. 1160).

In the *Butler case*, above cited at page 486, Mr. Justice Roberts said:

"The Constitution is the supreme law of the land ordained and established by the people. All legislation must conform to the principles it lays down. When an act of Congress is appropriately challenged in the courts as not conforming to the constitutional mandate the judicial branch of the Government has only one duty—to lay the article of the Constitution which is invoked beside the statute which is challenged and to decide whether the latter squares with the former."

The ninth and tenth amendments to the Constitution provide as follows:

Amendment 9: The enumeration, in this Constitution, of certain rights, shall not be construed to deny or disparage others retained by the people.

Amendment 10: The powers not delegated to the United States by the Constitution, nor prohibited by it to the States, are reserved to the States respectively or to the people.

Under these constitutional provisions, the United States Supreme Court has declared that the Government of the United States can claim no powers which are not granted by the Constitution or which are not given to it by necessary and just implication. This seems to have been the rule commencing with *Martin* v. *Hunter's Lessee* (4 L. Ed. p. 97), and on down through the decisions to the *Railroad Retirement Board* v. *Alton R. R. Co.*, above cited, covering a period from 1816 to 1935, and we find no modification of the rule since then.

Evidently, in order to get around the above-quoted constitutional provisions, the Cole bill, under the theory of conservation of crude oil as a natural resource, seeks to inject the idea of regulating commerce among the several States insofar as oil and gas are concerned.

In order to do that the constitutionality of this bill must be met, measured, and tested by section 8, article I of the Constitution of the United States; the part of which applies to this case is as follows:

"The Congress shall have power * * * to regulate commerce with foreign nations, and among the several States, and with the Indian tribes * * *."

Any Congressional act with reference to commerce must therefore be met, measured, and tested by this clause, and in this clause we are unable to read into it any necessary or just implication that could lead us to an interpretation that, by the greatest stretch of imagination, would grant to the Government the right to control or regulate production.

We strenuously maintain that the Cole bill does not contain any provision whatsoever which brings it within this constitutional provision—it says nothing about regulation of commerce among the States or with foreign nations or with Indian tribes. Except for the declaration of policy, which cannot be a part of the proposed law, as we have already shown, and with the further exception of section 19, which is the penal section of the bill, the word "commerce" does not appear anywhere in the bill. And if the "regulation section" (sec. 10) of the bill was excluded, nothing in the bill could be construed as even denoting commerce; hence, the proposed legislation, the Cole bill, cannot be dealing with commerce at all.

Certainly, the framers of the Constitution, in writing the clause last above quoted referring to the regulation of commerce, meant "commerce" and not something else, and "commerce" to us means just about the same as it does to dictionary writers and law book writers, namely: To carry on trade; business intercourse; the exchange or buying and selling of commodities, and particularly the exchange of merchandise on a large scale by the different communities, different States, or different nations; extended trade or traffic. Then we believe that there should be connected with commerce such words as carry, transportation, traffic, movement, etc. All of the above phrases and words have to do with commerce for they are synonymous with it, yet, we find none of them in the bill, nor do we find any combination of them in it. As a matter of fact, we believe that a careful study of the bill shows that it does not relate to commerce but simply seeks to regulate production within the States. And we submit that "production" is not "commerce."

"Production" not being "commerce," we are unable to see how it can be regulated under the guise of commerce, and therefore this bill is unconstitutional insofar as commerce is concerned, for under the commerce clause of the Constitution there is absolutely nothing about regulation, and under amendments 9 and 10 of the Constitution the right of production is reserved to the States.

"Production" and "manufacture" on one side distinguished from "commerce" on the other, has been the subject of litigation in the Supreme Court of the

United States for a long time (see following cases cited). It has been brought before the Court in two classes of litigation. One class had to do with the validity of State laws which were challenged as undue burdens on interstate commerce, and the other had to do with cases involving the validity of Federal laws, claimed to be valid regulations of interstate commerce. In all these cases which we are able to put our finger on, the Supreme Court has held that "production" is not "commerce." And we submit that if production is not commerce, the two cannot be the same, and not being the same, and the Cole bill relating solely to production and not to commerce at all, surely then it must follow that Congress cannot regulate "production" in the respective States under the guise of "commerce."

As to what is meant in law by the words "commerce," "production," and "manufacture," was started by the Supreme Court of the United States back in 1852 in the case of *Veazie* v. *Moore* (15 L. Ed. 545), and continued down through the years with the following cases:

Coe v. *Town of Errol* (29 L. Ed. 715), *Kidd* v. *Pearson* (32 L. Ed. 346), *Crescent Cotton Oil Co.* v. *State of Mississippi* (66 L. Ed. 166), *Heisler* v. *Thomas Colliery* (67 L. Ed. 237), *Oliver Iron Mining Co.* v. *Lord* (67 L. Ed. 929), *Utah Power & Light Co.* v. *Pfost* (76 L. Ed. 1038), *Champlin Refining Co.* v. *Corporation Commission* (78 L. Ed. 1062), *Chassaniol* v. *City of Greenwood* (78 L. Ed. 1004), *Detroit, International Bridge Co.* v. *Corporation Tax Appeal Board* (79 L. Ed. 777), and ending in 1938, according to our reseach, with *Milk Control Board of Penn.* v. *Eisenberg Farm Products* (83 L. Ed. 752). Probably the outstanding of the above cases on the fact that "production" and "commerce" are separate and distinct, is the *Utah Power & Light Co. case, supra*, in which the Circuit Court of appeals said:

"There is a distinction between production and commerce as commerce succeeds production and is not a part of it. Production or manufacture is a transformation of raw material into a change of form for use, while the functions of commerce consists in the purchasing, selling, and exchanging of commodities and the transportation incidental thereto."

The circuit court decision was affirmed by the Supreme Court of the United States (76 L. Ed. 1038) which latter court said:

"* * * the general rule that 'commerce does not begin until manufacture is finished, and hence the commerce clause of the Constitution does not prevent the State from exercising exclusive control over the manufacture.' "

Under the declaration in the Cole bill that it is to provide for an adequate national defense, we again lay the bill alongside the Constitution and measure it with the Constitution as we have measured the interstate commerce declaration with the Constitution.

Section 8 of article I of the Constitution provides:

"The Congress shall have power * * * to lay and collect taxes, duties, imposts, and excises, to pay the debts and provide for the common defense and the general welfare of the United States; but all duties, imposts, and excises shall be uniform throughout the United States."

By the most exaggerated imagination we cannot see how this bill can even be suggested under this provision of the Constitution. The bill does not provide in any way whatsoever for the laying and collection of taxes, duties, imposts, and excises for the purpose of providing funds for the common defense or general welfare of the United States. It in nowise brings into operation the taxing power of Congress, and why it even suggests in its declaration or preamble anything about the national-defense clause we are at a loss to understand.

We understand that the sponsors of the Cole bill in support of the national-defense proposition contend that petroleum is an irreplaceable natural resource essential to national defense. All this we very frankly admit, however, we answer the sponsors of the bill on this subject by saying that crude production is neither exhausted nor irreplaceable and further by saying that if there is any necessity for such instant legislation, Congress must proceed in a constitutional manner in supplying the Government's needs if it has such needs. It seems to us that Congress' first step, if it does believe that crude oil should be conserved for national defense, should be to conserve it in lands already owned by the Government and further by purchasing oil-bearing lands from others for the Government. The first, namely, conserving oil in lands now owned by the Government, is simply a matter of administration. The Government already has the authority under the provision of and the rules promulgated by the national oil and gas permit and leasing law. The latter, the purchasing oil-bearing lands is a matter of congressional action and proper appropriation to effect such action.

If the Congress is of the opinion that any natural resource of the Nation is essential, wholly or in part, for the Nation's proper defense, it, the Congress, has ample power to make purchases of that natural resource and hold it for the benefit of the Government. On the contrary, so long as individuals and individual interests are permitted to hold property, that right in such property is protected under the Constitution (*U. S.* v. *Eason Oil Co.*, 8 Fed. Supp. 365).

We believe we have shown the unconstitutionality of the Cole bill on both of its declarations of purpose, namely: to regulate interstate and foreign commerce, and second, to provide for the national defense; and, in addition, we have pointed out the way conservation of crude oil can be accomplished in a constitutional and legal way for the national defense, and we most respectfully submit that this honorable committee should report that H. R. 7372 do not pass.

Roy E. Ayers,
Governor of Montana.
R. P. Jackson,
Secretary and General Counsel for the Montana Oil Conservation Board.
William A. Weber,
Attorney at Law.

February 17, 1940.

STATEMENT OF EARL FOSTER, CONSERVATION ATTORNEY, CORPORATION COMMISSION OF OKLAHOMA

Mr. Kelly. The next witness is Mr. Armstrong.

Colonel Thompson. Mr. Chairman, Mr. Foster wants to file a statement for Judge Reford Bond, chairman of the Corporation Commission of Oklahoma.

Mr. Kelly. We will hear you then, Mr. Foster.

Mr. Foster. I do not want to be heard at this time. I do at this time want to present the statement of Judge Reford Bond, chairman of the Corporation Commission of Oklahoma. I happen to be conservation attorney.

This was prepared by Judge Bond, the chairman of our corporation commission, but I am authorized to say for the other two members, that they concur in it. Unless the Chair desires me to read it, I do not think it is necessary to read it and take up your time this morning. I have enough copies for all five of your members, and I desire to present it.

I also have a telegram from Judge Bond, which I would like to present.

(The telegram and statement of Judge Bond are as follows:)

W. J. Armstrong or Earl Foster.
Chief Conservation Officer,
Counsel, Conservation Department, Washington, D. C.

On account of my illness request committee to permit my statement to be filed. I will appear later for cross examination if necessary.

Reford Bond,
Chairman, Corporation Commission of the State of Oklahoma.

STATEMENT OF REFORD BOND, CHAIRMAN OF THE CORPORATION COMMISSION OF THE STATE OF OKLAHOMA

Mr. Chairman and Gentlemen of the Committee, the Corporation Commission of the State of Oklahoma appreciates the privilege of presenting briefly and succinctly its oppostion to the Petroleum Conservation Act.

The merits and demerits of the act will be brought to the attention of the Nation through the publicity of your hearings and by the study of an impartial, competent, conscientious congressional committee.

Neither the law nor the facts justify the control and regulation of the production of oil by our National Government.

The national defense provisions of the Petroleum Conservation Act read in part:

> To provide for the maintenance of an adequate national defense.

The necessity of the proposed legislation to conserve oil for the maintenance of an adequate national defense is refuted by the testimony of proponents, engineers, geologists, statisticians, and officials of the Army and Navy.

H. D. Miser, geologist in charge of the United States Geological Survey, estimated proven reserves in 1934 at 13,360,000,000 barrels and in 1938 at 17,500,000,000 barrels, an increase in 4 years of 4,140,000,000 barrels.

Rear Admiral H. A. Stuart, director of naval petroleum reserves, testified that the peace needs of the Navy annually were 9,000,000 barrels of fuel oil. The war needs yearly 50,000,000 barrels.

Col. Harry K. Rutherford, director of the War Department's Planning Branch, testified that the peace needs of the Army were 1,500,000 barrels of fuel oil per year, the war needs from 10,000,000 to 12,000,000 barrels per annum, which shows a total Army-Navy war need of 62,000,000 barrels of fuel oil. Production of crude oil will approximate a daily average of 3,413,000 barrels.

In addition to the factual showing of the increase in known reserves, the production necessary to meet market demand and Army-Navy peace and war needs, the surveys of thousands of geologists in the petroleum industry indicate there are new sources of supply which, with improved methods of production, will guarantee a supply of crude sufficient to meet the demands of war and peace for generations to come. Then why the necessity of Federal control to conserve oil for national defense, with annual reserves accumulating by the billion barrels, a production capacity to meet Army-Navy annual requirements monthly, and a potential capacity to meet war needs before a foreign battleship could cross our best allies—the Atlantic and Pacific?

The United States is a sovereign possessing the power of eminent domain, subject to the constitutional limitation that private property shall not be taken for public use without just compensation. This attribute of sovereignty can be conferred by Congress on the Secretary of War or the Secretary of the Navy.

These departments may acquire petroleum reserves by purchase or condemnation. Therefore, they should exercise the right to purchase or the power to condemn, and thereby insure an oil supply for national defense or aggressive war, rather than ask for legislative authority to control and regulate the production of crude oil in time of peace.

The right of eminent domain was upheld in *United States* v. *458.95 Acres of Land* (22 F. Supp. 1017):

> The United States is a soverign possessed of all the powers of sovereignty, including that of eminent domain.
>
> All private property is held subject to necessities of Federal Government, and the right of eminent domain underlies all such rights of property. *U. S.* v. *8,557.16 Acres of Land in Pendleton County, W. Va.* (11 F. Supp. 311.)

Congress has the power of eminent domain and can provide the procedure by which that power may be used. Section 257, title 40, United States Code Annotated, reads:

> Condemnation of sites; jurisdiction. In every case in which the Secretary of the Treasury or any other officer of the Government has been, or shall be, authorized to procure real estate for the erection of a public building or for other public uses, he shall be authorized to acquire the same for the United States by condemnation, under judicial process. * * * And the United States district courts of the district wherein such real estate is located, shall have jurisdiction of proceedings for such condemnation, and it shall be the duty of the Attorney General of the United States, upon every application of the Secretary of the Treasury, under this section and section 258 of this Title, or such other officer, to cause proceedings to be commenced for condemnation, within thirty days from the receipt of the application at the Department of Justice. (Aug. 1, 1888, c. 728, Section 1, 25 Stat. 357.)
>
> Express legislative power to procure, is necessary to authorize the condemnation of private property for public use. *U. S.* v. *Rauers* (70 F. 748.)

Section 161 of title 50, United States Code Annotated delegated to the Secretary of the Interior through the Bureau of Mines the right to condemn oil and gas leases for the production and conservation of helium:

> Acquisition and reservation of helium gas lands; production of helium gas—for the purpose of conserving, producing, and selling helium gas the Secretary of the Interior, through the Bureau of Mines, is authorized: (a) To acquire by purchase, lease, or condemnation, lands or interests therein or options thereon, including but not limited to sites, rights-of-way, and oil or gas leases containing obligations to pay rental in advance or damages arising out of the use and operation of such properties; but such lands or interests in lands may be acquired by condemnation only when necessary for the production or conservation of helium to meet the needs of the Army and Navy and other agencies of the Federal Government.

If Congress can delegate such extensive power of condemnation over one industry so closely related to the oil industry, it can delegate the same power over the oil industry itself.

This argument is further substantiated by a bill passed by the Seventy-fifth Congress on June 30, 1938, and found in volume 52, United States Statute Laws, page 1253:

> In the event of the inability of the Secretary of the Navy to make satisfactory exchanges of land or agreements for the conservation of naval petroleum with the private owners of lands or leases within or adjoining naval petroleum reserve numbered 1, as provided for in this act, he is hereby authorized, with the approval of the President, to acquire such privately owned lands or leases in naval petroleum reserve numbered 1 by purchase or condemnation. There is hereby authorized to be appropriated such sums as may be necessary to carry out the provisions of this act. Such sums shall be expended under the direction of the President, who shall submit to the Congress estimates therefor in the manner prescribed by law: *Provided,* That the Secretary of the Navy shall report annually to the Congress all purchase and condemnation proceedings entered into under the authority herein granted.

Congress can delegate the power of condemnation and such delegation of power can give to the Army and Navy a sufficient supply of oil to adequately care for any foreseeable demand for national defense.

Hon. Charles Evans Hughes in an opinion filed with the Federal Oil Conservation Board on May 27, 1926, said:

> Of course, the Government is entitled to provide for the common defense, and to secure suitable provision of oil for all its proprietary uses and for its naval and military service. It does not appear that the making of such provision requires, or involves, the exercise of any authority to control production within the States and thus take over the internal concerns of the States.

> The Federal Government has a large public domain. Instead of granting future oil leases, it can keep the oil within its property not already disposed of, if it so desires, and conserve it for itself. If the oil tracts within its domain are not deemed to be sufficient for this purpose, the Government can acquire other tracts. There is no limit to the power of acquisition of oil properties in order to meet the needs of the Army and Navy, or to provide for other governmental uses, except the limit which Congress may put upon the use of public moneys for that purpose and the disposition of the people to pay taxes. So far as the power is concerned, the Government can acquire for its uses all the oil lands that it needs, if it is willing to pay for them; and, as has been indicated, if the Government desires to conserve the oil in the ground, it can do so on its own properties within the public domain, and if this oil supply is threatened by contiguous properties, Congress may direct the acquisition of such properties upon proper compensation to the owners, to the extent deemed necessary.
>
> The acquisition of oil properties or of oil and oil products, in order to meet the needs of the United States as a proprietor, is a mere question of an estimate of needs and of financial policy.

Shall an offense be organized against the oil industry under name of national defense? Shall an industry in time of peace be nationalized for national defense, or shall the Government in time of peace acquire by purchase or condemnation oil reserves adequate to protect the Nation in time of war?

During the years of depression the oil industry has supplied domestic and foreign demands, improved its products, and increased its reserves.

In Oklahoma 55,627 oil wells produce annually more than 153,349,000 barrels of oil. Gross production and gasoline taxes approximate $23,760,653 per annum. Forty-one of the seventy-seven counties produce crude oil. Oil and gas leases cover acreage in 66 counties. Royalties and bonuses exceed $60,000,000 annually, and landowners are paid $8,000,000 yearly in rentals.

Oklahoma has 24 major refineries with a total per day capacity of 214,200 barrels, 35,000 gasoline pumps, and a total estimated value of crude and refined products of $357,430,000 per annum.

In Oklahoma the natural-gas production per annum has been estimated at the value of $7,300,000 at the well, and $32,970,000 to the consumers.

Kerosene consumption has been estimated at 45,000,000 gallons per annum, and heating fuel oil at 535,399 barrels per annum.

The estimated employees employed in production and transportation, drilling, refining, and filling stations average 83,810 annually, who are paid a total estimated sum of $115,405,000 per annum.

Oil contributes materially to the wealth of our commonwealth and to the revenues of our State government.

Halt the production of oil in Oklahoma, or cripple it with the law's delay, and you stop highway construction and maintenance, close the doors of many schools, and materially impair the State's most remunerative industry.

Why legislate the burdens of litigation and double policing on a progressive, profitable, and financially sound industry?

The constant threat of governmental regulation and interference with an industry that creates wealth and pay rolls of the oil fraternity is detrimental to the State's economic and financial structure. It touches the financier, the farmer, and the wage earner.

The provisions of the proposed measure pertaining to the promulgation of regulations to prevent waste are in part as follows:

> In the promulgation of regulations under this section (sec. 6), the commissioner shall consider and make proper provision concerning, among others, the following factors of waste:

The spacing, location, drilling, completion or production of any well or wells so as to cause waste of reservoir energy.

The drowning with water of any stratum capable of producing crude oil, or natural gas, or both.

The premature release of natural gas from solution in crude oil.

The operation of any well producing crude oil with an inefficient gas-oil ratio.

The inefficient, excessive, or improper use of reservoir energy."

Oklahoma has produced oil for more than 40 years. It is the third largest oil-producing State in the Nation, and a pioneer in conservation.

The corporation commission is a constitutional body possessing executive, legislative, and judicial powers. No State court, except the supreme court, has power to set aside, alter, or annul the commission's orders, rules, and regulations, and the supreme courts of the State and of the United States have upheld the constitutionality of the Oklahoma conservation laws.

The commission consists of three men, one elected each 2 years and each holding a 6-year term, thereby making a continuity in the commission so that there is no rapid turn-over in policy. The oil-and-gas-conservation department, which was originally established in 1917, has been subjected to few changes in personnel. The present conservation officer has held office for the past 14 years. For these reasons the corporation commission has been able to build up an efficient department that understands the problems of conservation from a practical and scientific standpoint and is thoroughly familiar with the individual pools and wells in the State.

Years of consistent, sustained, individual, and organized effort conquered avoidable waste in the oil fields of Oklahoma. The steps of progress are marked by the laws enacted, the rules and regulations promulgated, and the enforcement thereof by the commission.

In 1905 the Territorial legislature passed an act "to protect and regulate the drilling and operation of oil and gas wells" which, among other things, provided for the proper casing off of water and the plugging of abandoned wells, and required any gas well to be shut in within 10 days after completion, unless it was possible to utilize the gas for light, fuel, or power purposes.

In 1906 the Glen pool was discovered, and for the first time Oklahoma faced a serious problem of overproduction, principally due to the lack of transportation facilities and market demand.

In 1909 the legislature, to meet existing conditions, passed the Nation's first common carrier and common purchaser statute, requiring pipe lines to take and purchase oil ratably from every producer in the field.

In 1913 an act was passed relating to the production and transportation of natural gas, which prohibited the producer as well as the common carrier or purchaser from taking more than his proportionate part from any field, and limited the total amount that could be produced from any gas well to 25 percent of its daily natural flow, unless otherwise authorized by the corporation commission.

In 1915 Oklahoma again ventured into a new field of legislation, enacting two statutes which extended the definition of waste to include surface waste, underground waste, economic waste, and waste incident to the production of oil and gas in excess of market demand or transportation facilities. They required ratable taking in every oil and gas field in the State, and authorized the commission to promulgate rules and regulations to enforce their provisions.

Under the authority of these statutes the commission promulgated rules and regulations which effectively stopped waste, which resulted from the flush production in the Cushing and Healdton fields, and their enormous production was conserved and effectively regulated.

The discovery of the Seminole field in 1927 and the Oklahoma City field 2 years later brought about production greater than the State had ever known, and to meet these conditions the legislature in 1933 passed a complete and comprehensive law. Prior statutes, rules, and regulations were progressive, but due to the rapid development in scientific and technical knowledge earlier laws were found inadequate. This act gave the commission authority and power to prevent the various types of waste, protect the correlative rights of operators, producers, and royalty owners, and assure ratable taking. It also provided for an oil and gas conservation department with sufficient personnel, including experts, statisticians, legal and clerical assistants, to meet the problems of conservation.

In 1935 the conservation statutes were amended to give the commission additional powers and enlarge the definition of waste to specifically include dissipation of reservoir energy. In the same year a spacing law was passed which authorized the commission to establish drilling or spacing units, thereby practically nullifying the law of capture and empowering the commission to regulate drilling and require uniform withdrawals, potent factors in the conservation of oil and gas.

Clothed with authority under these statutes and sustained by the decisions of the supreme courts, the commission has carried on a most effective conservation program. Rules and regulations have been promulgated and enforced, requiring ratable taking, limiting production to market demand and transportation facilities, and preventing waste. Oklahoma is now conserving oil and gas in a practical and efficient manner, and Oklahoma laws have at all times kept pace with technical development and scientific knowledge.

Many of the wells in Oklahoma have been producing for years. Approximately 50,000 wells produce an average of only three barrels per well daily. In the absence of secondary recovery methods many wells would cease to produce. Through such methods millions of barrels of oil will be produced that otherwise would be left in the ground.

The commission has demonstrated its power to prevent waste and at the same time protect the heritage of private property rights and individual initiative and incentive.

For the efficient enforcement of any law, rule, or regulation, it is necessary to have the cooperation of the industry and the public. Therefore monthly meetings of the operators, producers, royalty owners, and persons interested in the oil industry are held, and the problems of conservation confronting the State and of each and every pool are discussed. Prior to these conferences a thorough investigation is made by experts of the corporation commission as to the porosity, permeability, thickness, and other characteristics of the sands for which rules are to be made. Bottom hole pressures, gas-oil ratios, potentials, and other producing characteristics are studied, and the experts attending the general meetings hear the discussions and present their findings, opinions, and recommendations. All methods of conservation employed are determined and enforced by the commission.

The Oklahoma laws have been useful to other oil producing States in enacting effective conservation statutes, and the rules and regulations of the commission have been a guide to other agencies. The Bureau of Mines, the Indian Department, the Osage Agency, and the United States Geological Survey have worked in wholehearted cooperation with the commission.

The corporation commission has coordinated experience and scientific information in an effort to promulgate the best possible rules and regulations. Pursuant to this policy, it has held its production to market demand, as estimated by the Bureau of Mines. In every important field brought on to production since the passage of the spacing law, spacing units have been established. At present there is no material economic, surface, or underground waste in any of the fields in Oklahoma.

The commission throughout the years has had the cooperation of the Governor, the legislature, and the State administrative powers in passing and enforcing proper conservation laws, rules, and regulations. The people of the State and the Nation are assured that Oklahoma will continue to pursue its conservation policies.

Then why with comprehensive State conservation laws, efficient and effective State conservation enforcement, risk a conflict between State and Federal control? Will Congress confer power on a Federal Commissioner to control State resources, invite bitterly contested court cases, subject a great industry to confusion and chaos and the slowness of justice? Oklahoma has faith in existing law and facts. Oklahoma has faith in our National Congress.

The interstate commerce provisions of the proposed measure provide in part:

> The employment of methods and practices which are wasteful of petroleum and of the reservoir energy available for the recovery thereof from such deposits * * * burdens and obstructs interstate commerce and causes harmful diversion of such commerce * * * causes interstate commerce to be the means of encouraging such wasteful methods and practices, and constitutes an unfair method of competition in interstate commerce.

Oklahoma employs no methods or practices which are wasteful of petroleum, which burden or obstruct interstate commerce, which cause harmful diversion of such commerce, or which encourage unfair competition. Then why invoke the interstate commerce clause to acquire control of the production of oil in our Commonwealth and obtain jurisdiction of a natural resource of our sovereign State?

The proposed legislation predicates its validity and the right of the Federal Government to manage, control, and regulate the production of oil and gas, and the methods to be employed on two principles: First, to provide for the national defense; and second, to regulate commerce.

As to the second declaration of policy with respect to regulating commerce, we assert that the control of production of oil and gas and the methods by which such production is obtained from the earth is in no wise a regulation of commerce between the States. Oil and gas are found beneath the surface of the earth. The land under which oil and gas are found, outside of the public domain, is a part of the dominion of the States, over which the States have sovereign jurisdiction and control. The act of producing oil and gas, or the methods employed in bringing the production to the surface, is not interstate commerce.

It seems obvious that the framers of the bill seek to create, by legislative fiat, jurisdictional grounds which do not, in fact, exist.

Intrastate activity cannot be made interstate by legislative assumption or declaration. The States are supreme in respect to all powers reserved to them. The Federal government may exercise only powers specifically enumerated in the Constitution.

The Supreme Court, in the case of *Champlin Refining Co.* v. *Corporation Commission* (286 U. S. 210, 76 L. ed. 1062), denied the principle that the production of oil, or the means or methods employed with respect thereto, was interstate commerce, and held that such activity was by character and nature intrastate business.

A proration order of the Corporation Commission of the State of Oklahoma was challenged. The court held:

> Plaintiff contends that the act and proration orders operate to burden interstate commerce in crude oil and its products in violation of the commerce clause. It is clear that the regulations prescribed and authorized by the Act and the proration established by the commission apply only to production and not to sales or transportation of crude oil or its products. Such production is essentially a mining operation and therefore is not a part of interstate commerce even though the product obtained is intended to be and in fact is immediately shipped in such commerce.

In *Heisler* v. *Thomas Colliery Co.* (260 U. S. 245, 67 L. ed. 237), it was stated:

> If the possibility, or indeed, certainty of exportation of a product or article from a State determines it to be in interstate commerce before the commencement of its movement from the State, it would seem to follow that it is in such commerce from the instant of its growth or production, and in the case of coals, as they lie in the ground. The result would be curious. It would nationalize all industries, it would nationalize and withdraw from state jurisdiction and deliver to federal commercial control the fruits of California and the South, the wheat of the West and its meats, the cotton of the South, the shoes of Massachusetts, and the woolen industries of other States, at the very inception of their production or growth; that is, the fruits unpicked, the cotton and wheat ungathered, hides and flesh of cattle yet "on the hoof", wool yet unshorn, and coal yet unmined, because they are, in varying percentages, destined for and surely to be exported to States other than those of their production.

One of the most far reaching decisions in interstate commerce was the *Consolidated Edison Company* v. *National Labor Relations Board* (83 L. ed. 131). In deciding the case Justice Hughes said, among other things:

> If industrial strife due to unfair labor practices actually brought about such a catastrophe, we suppose that no one would question the authority of the Federal Government to intervene in order to facilitate the settlement of the dispute and the resumption of the essential service to interstate and foreign commerce. * * * In determining the constitutional bounds of the authority conferred, we have applied the well-settled principle that it is the effect upon interstate or foreign commerce, not the source of the injury, which is the criterion.

It was held the company was carrying on business in interstate commerce due to the fact that it supplied electricity to railroads moving out of New York and to the piers along the water front from which both international and interstate commerce moved. The Chief Justice pointed out that the shutting off of electricity to the railroads and piers would tend to interfere to a large degree with the movement of interstate commerce.

In the case of *Carter* v. *Carter Coal* Co. (198 U. S. 238, 80 L. ed. 1160), Mr. Justice Sutherland said:

> The ruling and firmly established principle is that the powers which the general government may exercise are only those specifically enumerated in the Constitution, and such implied powers as are necessary and proper to carry into effect the enumerated powers. Whether the end sought to be attained by an act of Congress is legitimate is wholly a matter of constitutional power and not at all of legislative discretion.

It is interesting to compare same with the language of Mr. Justice Hughes in the *Edison Consolidated case:*

> In determining the constitutional bounds of the authority conferred, we have applied the well-settled principle that it is the effect upon interstate or foreign commerce, not the source of the injury, which is the criterion.

We call your attention to the further quotation in the *Edison case:*

> And whether or not particular action in the conduct of intrastate enterprises does affect that commerce in such a close and intimate fashion as to be subject to Federal control, is left to be determined as individual cases arise.

As the mind recoils from the conflict of decisions and dissent of opinion, we assert that the production of oil in Oklahoma does not affect interstate commerce in such close and intimate fashion as to subject such production to Federal control.

An industry upon which our economic welfare depends should be regulated by legal legislation. Then why not invoke the foreign commerce clause to conserve oil rather than the interstate clause to control state production? Why not reduce shipments in foreign rather than in interstate commerce? Why supply a market for warring nations if the oil is needed for our own national defense? Why not restrict oil exports for war rather than restrict the rights of sovereign States?

The Congress should invoke only sovereign and constitutional rights to conserve oil and gas, and free legislation of the danger of arbitrary power and dictatorship. American democracy should be expressed in law.

One of the purposes of the Petroleum Conservation Act according to the testimony of a proponent is:

> To provide for cooperation with the states in preventing the waste of petroleum.

Can State and Federal authorities cooperate if a diversity of opinion arises and State power is inferior to Federal power? Mr. David Hudson, Assistant Solicitor of the Interior Department, and author of the bill, admitted that the authorized regulations of the Commissioner would control if they were of a more restrictive nature than under state law.

At this time there is no conflict of authority between State and Federal authorities concerning the production of oil. The dual governments have manifested complete cooperation in the enforcement of conservation through the Connally Act and the Bureau of Mines. Then why enact legislation that may cause a conflict of authority?

Oklahoma does not need Federal control or regulation. The Federal supervision of individual leases and wells and the regulation of their production would result in a conflict of authority and a hindrance to conservation and legal contests in many courts.

The Petroleum Conservation Act grants no beneficial power that is not conferred by the Oklahoma statutes, and the Oklahoma laws include valuable provisions not mentioned in the national act, such as ratable taking and proration of oil to market demand.

Taking into consideration 40 years of experience of the oil fraternity, 40 years of service of scientists and experts, years of enforcement of the Commission and its conservation corps, Oklahoma is in a far better position to promulgate and enforce its own rules and regulations for the conservation of its natural resources than is any Federal agency. Oklahoma is fearful of Federal regulation. Oklahoma is opposed to Federal domination and dictatorship.

The power to conserve our natural resources comes from the police power of the State. The Federal Government must base its right to regulate and control the production of oil upon national defense or interstate commerce.

A Federal agency, far removed from the field of conservation enforcement, would impair and hinder local self-government, result in double expense in regulating the industry, and an unnecessary burden on the producer and operator.

If the bill is passed in its present form, a conflict of power and authority may result in chaos and confusion. The Commissioner has the power to determine waste, regardless of the jurisdiction of the State authorities, and the regulations and determinations of the commissioner control.

The nationalization of the oil industry may lead to the national control of State resources, to the centralization of industrial and political power, and to a threat to America's democratic form of government.

We are opposed to the centralization of power in government, opposed to the Federal regulation of the natural resources of our sovereign State. The Federal Government has the right to limit the importation of petroleum into our country, to prohibit the shipment in interstate commerce of oil produced in excess of the allowables fixed by the States. But the Federal Government is without constitutional authority to control and regulate the production of oil in the sovereign States. The Federal Government should exercise its constitutional rights, the States their sovereign rights, and thus cooperating and working in harmony, oil can be conserved for industry, for national defense, and for posterity. Every citizen of our Nation is subject to a dual sovereignty, State and Federal. Every industrial organization doing a Nation-wide business is subject to 49 sovereignties. The proponents of centralization in government contend that our sovereignties are excessive, cumbersome, and complex, but time has demonstrated that these 49 sovereignties and the constitutional checks and balances on the legislative, executive, and judicial departments of government constitute the bone, blood, and sinew of American freedom.

Oklahoma is jealous of her sovereign rights. She has demonstrated the legal and scientific ability to conserve her natural resources. Today she is conserving oil and gas practically, efficiently, and effectively.

The usurpation and misuse of power may be common in other nations, but the American Congress will never confer arbitrary power upon the mere belief that it will be used without a taint of dictatorship. The Congress will resolve every legal doubt in favor of the sovereign States. Oklahoma rests her case upon our Constitution, our court decisions, and the sound discretion of our National Congress.

Respectfully submitted.

REFORD BOND,
Chairman of Oklahoma Corporation Commission.

STATEMENT OF WILLIAM J. ARMSTRONG, OIL AND GAS CONSERVATION OFFICER OF THE CORPORATION COMMISSION OF OKLAHOMA

Mr. Kelly. We will hear you, Mr. Armstrong. You may proceed.

Mr. Armstrong. Mr. Chairman and gentlemen of the committee, my name is William J. Armstrong, oil and gas conservation officer of the Corporation Commission of Oklahoma. There has already been a statement made, which has gone into this record, by our Governor, the Honorable Leon C. Phillips, and also a statement just filed by the chairman of our commission, Hon. Reford Bond.

It is the purpose of our commission that I should discuss with this committee briefly the practical applications of this law, if it were to be adopted and some of the effects which the proposed bill of regulating the industry would have.

We have no quarrel with that part of the bill which involves the question of preventing waste in the production of oil and gas, because that question is not debatable. The controversy concerns the question of what laws, rules, and regulations should be established and how, and by whom, these are to be administered without conflict of authority in order to be most effectual and in the best interest of the people and the industry. At the outset, we hold that the regulation of industry should be such as to best serve the interests of the whole people. We hold, at the same time, that an industry as far reaching as the protroleum industry must not be so overregulated by duplication of authority that it cannot properly function in the development and production of a product so essential to the life and welfare of the people.

The proposed bill is drastic beyond the necessity and practicability at this time. It gives enormous power and authority to one person to make arbitrary rules and regulations that can confiscate without compensation the property of individuals and companies in the name of conservation. The public officials of Oklahoma, the oil industry and every citizen of our State, are in favor of conserving this irreplaceable natural resource and we yield to no one in our determination to protect it for the benefit of the people of the United States; being fully aware of the importance of oil to the general welfare and safety of our Nation.

Not with the intention of burdening the record, but rather that we did not lose sight of the basis of this whole investigation, and in order that we may not be misconstrued in our statement, let me briefly review those portions of the bill itself which, to us, have particular significance.

In section 2 of this bill, are stated the general policies in respect to conservation. It states that the employment of methods and practices which are wasteful in the production and storage of petroleum is inimical to the maintenance of adequate reserves available for national defense. In Oklahoma, we fully realize the importance of discovering, protecting and preserving our reserves. This is the backlog of our State. The people of our State recognize this fact. Our laws are adequate and our rules and regulations are sufficient to prevent wasteful practices and conserve our reserves, and this is being done. The State regulatory agency is cognizant of the fact that adequate reserves must be available for national defense and we are absolutely confident that this can and will be met without wasteful practice.

In section 4, the Commissioner is to be appointed by the President and he is to be under the Department of the Interior in the Office of Petroleum Conservation.

Section 5: The Commissioner would be empowered to investigate the conditions of petroleum production in all fields within the United States to determine whether or not methods and practices employed in any of them are effective in preventing avoidable waste, including physical and waste of reservoir energy. In making such determination, it is provided that the Commissioner consider the porosity and permeability of the deposit, nature and character of the reservoir energy, well spacing, drilling practices and completion of wells, the rate of decline in reservoir pressure per unit of oil produced, the gas-oil ratio, water encroachment, the method of well completions, conditions of storage of crude, the conditions of sources of supply and other characteristics.

All of these requirements, and more, are considered and regulated under our Oklahoma Statutes by present rules and regulations.

Section 6: If, upon investigation, the proposed Commissioner finds that any field is being regulated effectively to prevent waste, he may make this known to the State regulatory body. On the other hand, if he finds that the methods and practices employed are not effective in preventing what he thinks is avoidable waste, then to prescribe his own methods and practices which he thinks is best for preventing waste and in doing so, he may take into consideration the spacing, locating, drilling, completion or production of any well, the escape to the air or burning of natural gas, the loss by evaporation, exposure, or wasteful burning of crude oil, the existence of possible fire hazards, the drowning by water of any stratum capable of producing oil or gas, or both, the escape of crude oil from productive formation through drainage, seepage, or uncontrolled migration, the premature release of natural gas from solution in crude oil, the operation of any well producing crude oil with an inefficient gas-oil ratio, the inefficient excessive or improper use of reservoir energy, the excessive production of natural gas, the abandonment of any oil well in such a manner as to render any crude oil unrecoverable, or reservoir energy available for the recovery of crude oil. Also, it is provided in this same section that any well flowing substantially at its open-flow capacity shall be deemed prima facie evidence of avoidable waste and subject to investigation and the establishment of rules by the Commissioner.

All of the features enumerated in this section are important and should be taken into consideration in the determination of avoidable waste. Too, each of them are questions on which reputable engineers and experts are not always in common agreement on the solution, not only of the proper factors to be considered, but also on the weight these factors should be given. In Oklahoma, we consider these factors in the light of our current experience and contend, because of our proximity to the daily arising problems and the confidence and wholehearted cooperation of the industry with our efforts, wholly justifies our contention that the administration of these problems should continue under the vested rights of the State without duplication of authority by a long-ranged control.

Considerable emphasis has been put on gas-oil ratio in this proposed bill. It is a highly controversial question and has been for several years because it was one of the first recognized factors in the control of production. It was then believed to have larger weight in conservation of reservoir energy. With the advance of knowledge and development by experience and also the great difficulty of accurately determining the proper gas-oil ratio, it is fairly well agreed that the rate of decline in reservoir pressure per unit of crude oil produced is far more proper and indicative of reservoir conditions than is gas-oil ratio taken by itself. This is pointed out as an example of the great importance which can and has been gathered around a single factor which has long ago been superseded by other and more important factors. In other words, bottom-hole pressure is probably the most important factor in the control of reservoir energy as now known, at least from a practical standpoint. This pressure may be either the control of gas energy or hydrostatic pressure. In some fields, the gas pressure is almost negligible and the water pressure is the dominant factor and in this case, the control of water movement is of first importance. This principle of control apparently has not been comprehended by the technical proponents of this bill, as indicated by their testimony before this committee and I feel that while gas-oil ratio is important, there has been entirely too much emphasis put on this one factor.

Section 7 provides for the approval by the proposed Commissioner of voluntary agreements among operators under certain conditions. Our Oklahoma law makes this provision and many cases have been approved by our corporation commission when the conservation statutes have been complied with. However, in all of these cases, the corporation commission always retains jurisdiction, in order to change or modify the rules and regulations in the particular case, even under voluntary agreement, because as conditions change this may become necessary. Certain standards must be complied with.

Section 9 provides that the employment of any method or practice designated by the rules and regulations as made by the Commissioner as wasteful, is declared to be unlawful. This we hold as a delegation of extreme power, and infringement upon State rights, a duplication and a direct conflict of authority.

Section 11 provides, in substance, that the Commissioner be given authority in carrying out this act to cooperate with the State officials, executive, and agencies, or with the agencies of any State pursuant to a joint agreement between two or more States.

This provision is vague and subject to wide interpretation. In the first place, the Commissioner is authorized and empowered. He is not directed to cooperate with any of these agencies under this section. Furthermore, it may be interpreted that if he does cooperate and hold joint hearings with the State agencies, he is not bound in his decisions by their advice.

Section 15: In this section we find:

> Findings of the commissioner as to facts, if supported by substantial evidence, shall be conclusive. The commissioner may modify his findings as to the facts, by reason of additional evidence so taken, and he shall file such modified or new findings which, if supported by substantial evidence, shall be conclusive, and his recommendation, if any, for the modification or setting aside of the original order.

Of course, the Federal court of appeals may set aside this order, but up to that point, the proposed Commissioner's order is final.

Section 18 proposes an advisory committee to the proposed commission of 18 members. It may be interpreted that this committee would supersede the Interstate Oil Compact, without the prestige of the compact with the industry and with none of the authority given the compact by the States.

Section 19 provides the prevention of shipment of illegal oil in interstate commerce. In other words, the Connally Act is to be included in this proposed bill.

The Congressional Record discloses that at the time this bill was introduced in Congress, certain remarks of Mr. Cole's were extended upon the Record, a part of which I would like to quote purely for the purpose of discussion:

> The bill intends to develop every possible cooperation between State officials and Federal officials in the oil industry for the prevention of waste. To this end a council on petroleum conservation is established. The bill is designed solely as an oil and gas conservation measure and does not attempt to control supply through the establishment of production, marketing, or transportation quotas and does not affect imports or exports of petroleum and does not provide for any coordinated industrial action in refining and marketing.

Many references are made, both in the bill itself, and in Mr. Cole's remarks at the time it was offered in regard to cooperation by the Federal agency with State officials. However, the bill, in its present form, provides for one individual clothed with the full power to function wholly and independently from the State agencies on all matters involving conservation and under the same circumstances.

Certainly clothed with such authority, many situations would arise where regulations of the State agency would be in conflict with the regulations of the Commissioner. The position of an operator and all operators affected by such regulation would be most difficult indeed, if not impossible to conform to. Under the proposed bill, naturally, a vast organization must be set up, not only in Washington but in the many fields of the several States, duplicating the efforts and work already being done by the great majority of oil producing States. Also, if the authority and functions of the State having conservation laws were superseded by Federal authority, the vast experience and money expended by the States in acquiring this experience would go for naught. It must be borne in mind that in setting up a duplicate organization such as this bill proposes, the money necessary to carry out and administer the work of this vast new department of the Government must be borne by the overburdened taxpayer.

I reiterate our Oklahoma law covers everything that is covered by the proposed bill and more. There is no issue that can be raised between the agents of the Federal Government, the agents of the State, or the representatives of the industry on the fundamental question of conservation. All three agree that there must be conservation rules and regulations and all agree that everything practicable and possible must be done to prevent waste in the production of oil and to produce the greatest ultimate recovery from every well and every pool in the United States.

The only controversies are the kind of rules to be adopted and who shall administer these rules. For example, the petroleum engineers of the Government, the State, and the industry will more often than not find great difficulty in agreeing—for instance, on a certain given gas-oil ratio to be adopted in any one pool over any length of time. The question of gas-oil ratio is one of the most controversial questions that has ever been raised in regard to conservation laws. The records of the State regulatory bodies contain literally millions of words of testimony in this regard. Under this proposed bill, the commissioner is empowered to establish gas-oil ratios in every oil field in the United States and whatever rule the commissioner establishes will hold until the courts reverse it. The only remedy for the oil operator, or the many oil operators, that is given against this dictatorial power is an appeal to the Federal Court of Appeals, where it may take many months or years to get relief and while his appeal is pending, his wells are shut down. If the proposed bill should become a law and that law is enforced, as interpreted by the Secretary of the Interior in his recent testimony before this committee, to the effect that the chief necessity for a Federal act is the failure of the oil producing States to have uniform conservation laws and the failure of these States' agencies to properly enforce the conservation laws which they do have. I do not agree with this allegation.

In the first place, I contend that the various oil producing States which do have conservation laws, adequately provide for the prevention of waste, both above ground and below ground, and that this is the fundamental basis of conservation. All of the basic principles, as now recognized by students of conservation, are adequately provided for in the various States' conservation laws, rules, and regulations. There may be some minor factors and features which are not covered by a few of the States. These, however, are constantly being remedied by the States' legislatures as their importance is recognized. For example, last year Arkansas passed an entirely revised and up-to-date law. Michigan, likewise, passed what has been commonly known as a "streamlined" law. The Kansas Legislature, recognizing the need in its statute for an elimination of direct interpretation of the law of capture, revised its law, recognizing wider well spacing, the distribution of allowable production between pools, as well as in an individual pool. These are cited only to emphatically show that the refinements as the need for them is developed, are recognized and enacted by the laws of the several States. Conservation is an evolutionary matter as our knowledge and practices develop and improve according to the needs and circumstances. The States inevitably have improved and brought up to date their statutes governing the control of this resource.

In Oklahoma we have enforced regulations with respect to gas-oil ratio in every pool in accordance with an attendant upon the physical facts developed from engineering investigations.

If a gas-oil ratio is established in each pool and the high gas-oil ratio wells were shut in and the low gas-oil ratio wells allowed to produce without any compensation to owners of the high gas-oil ratio wells, then these wells favored by structural conditions would ultimately produce all of the recoverable oil in the given source of supply. This is the condition that causes the controversy. Operators owning leases down structure would always favor the shutting in of high gas-oil ratio wells up structure, resulting in capture of part, if not all, of his neighbor's oil due to the lack of communitization or compulsory pooling of leases, the operator whose wells were shut in, would be deprived of his fair share of the recoverable oil. The proposed law gives the commissioner this authority. No man who has had any practical experience in the production of oil would want this much authority, and Congress should not grant such unlimited authority to any one commissioner.

Arbitrary rules made by the proposed commissioner at Washington would certainly not have the support of the industry in the fields where rules are made by the local authorities and the greatest of confusion would result, and all the police power in the country, both State and Federal, could not enforce these rules unless the industry could be convinced that they were fair and equitable and would be honestly and fairly enforced.

On the theory that power and authority once granted would be exercised, I cannot escape the feeling that if the bill were enacted in its present form, the activity of the State agencies dealing with proration and conservation would be superseded by the Federal agency created with such broad power and authority in this connection. The proposed law says nothing about common interest, about correlative rights or market demand. Our Oklahoma law defines a common source of supply to be a community interest and directs the State authorities to protect the correlative rights of the owners.

If the Congress should find that this type of legislation is necessary in the interest of conservation, then it would be essential that some provisions be made to compensate the unfortunate lease and royalty owner whose property, under these rules, could be confiscated. It is impossible and impracticable for the taxpayers of the United States to have to pay for these properties. At the same time, it is unfair that they be confiscated without being compensated. It would destroy the confidence of our citizens in our Government. This bill, if it became law, would retard the discovery and development of unknown reserves because of the uncertainty it would create. It would, in a manner, reestablish what is known as the "carpet bag rule" from Washington, so much detested in Oklahoma and the Indian Territory before statehood. There must be some certainty as to what the wildcatter can do with his well if he discovers a new pool, or he will not risk his money in prospecting in new reserves. It is essential to the life blood of the Nation that our great unknown petroleum reserves be discovered and developed. It is very essential to the welfare of the consuming public that no shortage of oil be created by artificial means, or ill-considered legislation.

The State regulatory bodies have the confidence and cooperation of the industry under the present State laws and I am certain that it would be impossible to maintain this confidence under such a Federal law as proposed, because of the constant uncertainty of what the Commissioner in Washington might rule on this or that problem.

The passage of this bill, or any other like bill, giving the authority in Washington complete control of the oil industry would only add to an unhappy condition in this and all other industries, because of the growing and well founded fear of the Federal Government's ever-expanding reach for power through control of the industry of this country.

If the committee please, I would like to answer a question or two in reference to the 15-day shut-down in August 1939.

Mr. KELLY. Mr. Armstrong, in the reading of your statement, and the opinions expressed, let me ask if that was your attitude in 1934 also prior to the creating of this committee.

Mr. ARMSTRONG. Yes, sir.

Mr. KELLY. It seems to me that it was the State of Oklahoma that initiated the selection of this committee, through the Thomas-

Disney bill, that granted more power to the Federal Government than this bill ever attempted to.

Mr. Armstrong. I disagree with you, Mr. Kelly. The Thomas-Disney bill as I understood it was proposed for the purpose of strengthening local laws and cooperating with the States, in limiting production to the consumptive market demand and fixing quotas of production for movement in commerce. This bill is proposed for the purpose of taking over the oil industry completely and the State agencies through the bureaucrats in Washington.

This bill gives power to this one commissioner to do almost anything on earth to this industry. If I were the commissioner under this bill I could cut the production of the United States to half of its present production, which would increase the price of oil two or three times and force us to go to South America or somewhere else to get the supply for the actual needs and demands of this country.

Mr. Kelly. That was provided also under that bill.

Mr. Armstrong. I did not understand it that way.

Mr. Kelly. Well, we disagree as to that. However, at that time I remember that it was the State of Texas which openly rebelled against the passage or consideration of that bill.

Mr. Armstrong. I do not believe that any State official of Oklahoma—I am not sure about that—I know that the corporation commission did not and the conservation officer did not appear before the committee at that time, nor were they requested to appear. If we had been we would have expressed our opposition to any bill that entirely took over the industry by the Federal Government. Our position would have been the same as it is now.

Mr. Kelly. I guess that is all, Mr. Armstrong.

Mr. Armstrong. Could I make one answer to this shut-down business in August?

Mr. Kelly. Surely.

Mr. Armstrong. I feel that the committee, of course, is emphasizing that matter entirely beyond any necessity. However in Oklahoma we acted under a law which gave us valid and legal reasons. Our law provides that any production allowed more than the market demand creates waste. That is in the statute and it has been sustained by the Supreme Court of the United States in the *Champlin case* in 1931.

That was the reason for the shut-down.

There was a question, of course, of whether we would take and make this cut back within a couple of weeks or whether we would do it over a period of time. I think the Bureau of Mines' records will show that approximately 85,000 barrels a day was produced in the United States more than the Bureau's estimates of market demand, consumer's market demand from the 1st of January 1939, to the 1st day of August. That accumulated overproduction became acute in the month of August.

Now, I want to say something else about that situation. In Oklahoma we started active prorating of oil in 1927. There has been some proration of oil in some of the fields ever since.

The average price of 36 gravity oil from 1917 to 1927 was $2 a barrel. The average price from 1927 to 1940 of 36 gravity is $1.07. So, the consumers have been protected and if we are in the price-fixing business under the proration statutes, we certainly have made a failure of it.

I thank you.

Mr. KELLY. Thank you Mr. Armstrong. The committee will recess until 2 o'clock.

Mr. SCHOEPPEL. In view of the fact that the statements or documents that were filed last night, of course, involve my State of Kansas in relation to the other States, I would like to have the record reflect the request for an opportunity of presenting additional evidence or an additional statement maybe by filing it with the committee in answer to that charge.

Mr. KELLY. You may have that privilege.

Mr. ARMSTRONG. For Oklahoma, I would like to have the same privilege.

Mr. KELLY. Yes, you may have that privilege.

Colonel THOMPSON. Texas would like to have the same privilege.

Mr. KELLY. All States may have the same privilege.

Colonel THOMPSON. Thank you.

Mr. KELLY. We will recess until 2 o'clock.

(Thereupon, at 12:15 p. m., the committee took a recess until 2 p. m., of the same day.)

AFTERNOON SESSION

(The subcommittee reassembled at 2 p. m., pursuant to the taking of a recess, Hon. William P. Cole, Jr., presiding.)

Mr. COLE. The subcommittee will please come to order.

I understand this morning that Mr. Kelly concluded with everyone from the State groups, is that right?

And it is our privilege to hear you now, Judge Fouts.

STATEMENT OF MR. ELWOOD FOUTS, HOUSTON, TEX.

Mr. FOUTS. Mr. Chairman and members of the committee: I am very thankful to you for permitting me to speak at a time when I was not supposed to appear. It is not at my request, but it is the desire of some of the regulatory authorities, and the fact that the matter has been mentioned several times has been rather embarrassing to me, because I had submitted this rather brief paper to the committe with a view for its serving such useful purpose as it might in the committee's record. I am very happy, however, to present it. It is not intended to be argumentative. It is an effort to talk in a reasonable way about a very difficult problem. I think it demonstrates the utter impossibility of any type of Federal regulation being the proper solution of any of the difficulties in the oil business.

The following provisions defining waste and waste prevention factors are taken verbatim from the proposed Cole bill.

Now, you gentlemen have read that bill, of course, many times and I will not read those provisions. They are the definitions of waste and the factors by which waste is proposed to be controlled. The formula embraced shows waste to be above ground and below ground waste and prescribes the manner in which that waste is to be prevented under this bill.

(The provisions referred to are as follows:)

SEC. 5. (b) Within the meaning of subsection (a) of this section—

(1) Physical waste of crude oil shall be deemed to include the loss or destruction of crude oil after recovery thereof such as to prevent its application to useful

purposes, and the entrapment or isolation of crude oil through irregular or premature encroachment of water, the loss or dissipation underground of crude oil or natural gas, and the premature release of natural gas from solution in crude oil, all such as to render impracticable the recovery of such crude oil.

(2) Waste of reservoir energy shall be deemed to include the use or dissipation of such energy, either as gas energy, hydrostatic energy or other natural energy, at any time at a rate or in a manner which would result in the exhaustion of the energy available for the recovery of crude oil prior to the recovery of the ultimate quantity of crude oil which such energy would be or might be made effective in recovering or rendering recoverable. Reservoir energy available for the recovery of crude oil shall be deemed to include that natural energy existent in any deposit containing crude oil in the recovery of which such energy may be made effective.

SEC. 6. (b) * * * In the promulgation of regulations under this section the Commissioner shall consider and make proper provision concerning, among others, the following factors of waste:

(1) The spacing, location, drilling, completion, or production of any well or wells so as to cause waste of reservoir energy.

(2) The loss by escape into the air or by wasteful burning of natural gas.

(3) The loss by evaporation, exposure or wasteful burning of crude oil.

(4) The existence or creation of fire hazards.

(5) The drowning with water of any stratum capable of producing crude oil, or natural gas, or both.

(6) The scape of crude oil from a productive formation through drainage, seepage, or uncontrolled migration.

(7) The premature release of natural gas from solution in crude oil.

(8) The operation of any well producing crude oil with an inefficient gas-oil ratio.

(9) The inefficient, excessive, or improper use of reservoir energy.

(10) The excessive production of natural gas alone or in conjunction with crude oil from a source of supply containing both, even though such natural gas is used or transported for use in the generation of light, heat, or power, or for other purposes.

(11) The abandonment of any well in such manner as to render any crude oil unrecoverable or reservoir energy unavailable for the recovery of crude oil.

Mr. FOUTS. Provisions of similar import are embodied in regulatory statutes of the oil-producing States and appear in the interstate oil compact.

Mr. COLE. Is it all right, Judge, if I interrupt you?

Mr. FOUTS. Yes, Mr. Chairman.

Mr. COLE. I see you have stated here in your paper that "provisions of similar import are embodied in regulatory statutes of the oil producing States and appear in the Interstate Oil Compact."

I have rather gathered from the testimony before us so far as the provisions of sections 5 and 6 of the bill are concerned and the definition of waste, formula to prevent waste, the bill seeks to lay down a provision which is a little in disagreement as to the formula found in the other bills.

Mr. FOUTS. That is correct.

This paper undertakes to direct attention to a single fact without the presence of which it is impossible to avoid preventable waste or enforce conservation under the prevailing meaning of those terms. This major essential has been obscured by detail. It is: An oil field cannot be developed and produced without avoidable waste unless every well therein has a pipe line or other outlet connection through which it can produce its ratable portion of the daily production.

The concept of preventable waste in the production of oil and gas and the method of its prevention generally accepted by probably 90 percent of those familiar with these matters is substantially as follows:

Preventable waste of oil or gas is said to occur in one of two forms—either above ground waste such as storing oil in earthen storage or permitting it to escape down the beds of streams, or burning it uselessly as produced; underground waste which in the final analysis embraces any type of producing practice which results in the failure to make a substantial recovery of the maximum amount of oil or gas obtainable from the reservoir under practicable operating conditions.

Mr. Cole. Judge, may I ask you to go back for a moment to the statement in your paper: "Conditions of similar import are emboided in regulatory statutes of the oil producing States and appear in the interstate oil compact." What do you mean by that last statement?

Mr. Fouts. You have almost this formula that is set forth here in the interstate oil compact as to the types of preventable waste which it calls on the compacting States to join in preventing. In other words above ground and below ground waste and the manner of that prevention is substantially approached from the same standpoint as the definitions in formula in this bill.

Mr. Cole. I suppose you have reference to article 3 of the compact, do you not?

Mr. Fouts. That is right.

Mr. Cole. So that if article 3 of the compact is not fully in agreement——

Mr. Fouts (interposing). Not as comprehensive, Mr. Chairman, and I do not say that. I say of similar import.

Mr. Cole. It would be an improvement to the compant if it were changed to be as comprehensive as some of our State laws and as we find in this bill, would it not?

Mr. Fouts. Oh, I do not know. I think that an ordinary businessman if he went to fix up this as a direction to an employee would probably say it in a half dozen lines and everybody would understand it about the same. It is designed to prevent above ground waste and below ground waste. That, however, is a matter concerning which I do not wish to enter into any debate with you, or anyone, who feels differently.

The keystone or essential factor necessary in every oil field in order to make it possible to avoid either type of waste is the right of every well producing from the reservoir to have its fair and equitable share in the market available for the pool. Or, in simpler words, before you can have any kind of waste prevention measure that is effective or before you can have any kind of conservation that is workable it is essential that every well have an outlet by which it can market its equitable portion of the field's production, under all the facts of that particular field.

It is easy to see why this is true. For example, if a strong operating company owning producing wells covering a portion of the reservoir and owning the only pipe line facilities sufficient to take and transport to market the oil produced from the field, only takes oil from its own wells and declines to purchase oil produced by the other operators in the pool, it is inescapable that one of two things must happen. Either the operators having no outlet to market must close in their wells, in which instance you have disproportionate and uneven withdrawals from the pool so as to cause a shift in pressure in the reservoir, the wasteful migration or movement of the oil and gas itself in the reservoir, substantial disturbances affecting reservoir energy voiding any well spacing program and causing premature water encroachment and a general result of practically nullifying, in effect, all factors which may be used to prevent underground waste. If, on the other hand, the operators who have no outlet to market produce their oil under such conditions, they are compelled under the pressure of such producing conditions to provide temporary storage which in the nature of things usually results in earthen storage and other similar wasteful above ground practices. Waste prevention therefore comes back to the requirement that all wells must have a fair and equitable outlet.

The basic concept of the reservoir as a unit and the necessity of producing it as a unit in order to avoid underground waste has long been recognized. The *Champlin case* which originated in Oklahoma and went to the United States Supreme Court is authority for the proposition that a field should not be allowed to produce under conditions forcing some of the operators to indulge in temporary storage or other similar wasteful practices because they have no facilities by which to get to market. It sustained the Oklahoma market demand statute.

The general formula copied from the Cole bill and set forth at the head of this paper represents no innovation and differs very little from the first statutory pronouncements made years ago along that line; then, as an actual operating problem, when the regulatory authorities were confronted with the fact that to accomplish the mandate of the statute to prevent avoidable waste, either above ground or below ground, it was necessary to have pipe line connections and fair and equitable outlets to all wells, they encountered what had been the fundamental difficulty in conservation regulation.

Out of this difficulty there ensued a long period of bitter conflict and struggle involving property rights, real estate law, engineering principles, physical characteristics of producing fields, permeability and porosity of their sands, the propulsive or energy force which was available as a solvent and lifting power to enable maximum recovery of oil from the reservoir. Literally thousands of geologists and engineers have testified thousands of times in numberless instances of actual court litigation in the united drive of conflict and search for a feasible answer. With the entire brains of every phase of the oil industry contributing there was brought forth through the slow process of limitless trial and error the evolution of the general plan now universally used and commonly known and embraced in the word "proration" which in its simplest analysis means no more or less than a fair market outlet of its ratable proportion for each producing well in the field, taking into account the physical and engineering facts involved.

The first step toward this end seemed very simple. Oklahoma passed a law known as the common purchaser act, the effect of which was intended to compel the pipe line or purchaser that bought oil in any field to take its requirements ratably from all of the wells. But it so happened that most of the pipe-line purchasers had their own production and when they declined to buy the oil of other parties the courts were unable to find a way to make a man buy something he didn't want to buy. Texas tried the same plan and arrived at the same result both with respect to oil and gas. This simple statement actually encompassed years of litigation, trial, and error.

But the growth by the slow American process proceeded. There evolved out of this tangled maze of conflict the conception that there could be no conservation; therefore, there could be no waste prevention regulation unless a way was found to provide for uniform and ratable takings of oil from all wells. And little by little the thought evolved into a formula, not clear, but dim and obscure, which had as its thesis the belief that if there was a demand for a certain quantity of oil of a certain quality coming from a given field and the regulatory body prescribed a rule that no more than that quantity could be produced and set forth by its findings the amount that could be ratably allotted to each well, the purchaser then out of force of necessity would buy all of the oil from all of the producers in order to get the full amount of his requirements.

That thought grew into and became the basis of the so-called market demand statutes which now appear in the conservation laws of practically all of the States. And may I interpolate the statement that the law of Arkansas is no exception to this rule.

Mr. Cole. Why do you say that?

Mr. Fouts. Well, I thought you might ask me that question later. For that reason I brought it up at this time.

Mr. Cole. All right.

Mr. Fouts. And I will try to answer you now.

You recall that the chairman of the Arkansas Conservation Commission explained to you that their statute was so written that it was their duty under the statute to see that every well had its equitable or ratable portion of the field's outlet and he explained that they had the power and exercised it when confronted with a demand less than the field's allowable, to reduce that allowable so as to compel connections with every well and you recall that that statute was written last year. When I have finished this paper, we can, if you care to come back to it, discuss it and I think you will understand why it is now probably true that a court will sustain my interpretation of that provision of the Arkansas law.

Mr. Cole. Judge, while we are discussing this statement in your paper, you said that the Arkansas law was no exception to this rule that challenges very directly the statement I made yesterday that the Arkansas law does differ from other State laws and I think we might as well have that out now and see who is right.

My understanding is that the Arkansas law makes no reference whatsoever to market demand and all other State laws do. Am I right?

Mr. Fouts. The words "market demand" do not appear in that statute.

Mr. Cole. That is right. In the other statutes they do.

Mr. Fouts. That is right.

Mr. Cole. And in the production allowables for Arkansas, the Arkansas commission's determination of production allowables results from findings before them which take into consideration the physical characteristics of the field to the exclusion of the quantity of oil which the purchasers will buy. Is that right or wrong?

Mr. Fouts. No, sir; that is not right.

Mr. Cole. It is my understanding that it is right.

Mr. Fouts. Well, I think you are in error.

Mr. Cole. All right. The market demand items such as you claim are between the lines, I presume in the Arkansas law, because it is not there in black and white. It was as originally introduced in the legislature, but was eliminated by specific amendment.

Mr. Fouts. Yes, sir.

Mr. Cole. Does that not show the clear intent of the Arkansas legislature that it should not be a part of the law?

Mr. Fouts. I do not think so, sir. I think that certainly is going to be a matter that will have to be litigated before we can ever answer that question.

Mr. Cole. The witnesses from Arkansas, I think, concede just the opposite. I cannot follow you at all in the interpretation you place upon the Arkansas law.

Mr. Fouts. The witness, if I may be permitted——

Mr. Cole. Did they?

Mr. Fouts. If I may be permitted, disagree with you. The witnesses explained that while they had no specific use of the words "market demand" in their statute, their ratable provisions accomplished the same result and if wells got disconnected because too much oil was being run from the field, they cut the allowable down so as to make it possible for every man to get his ratable share.

Mr. Cole. Yes.

Mr. Fouts. Now, that is just a question as to whether under the statute they have that authority. If their statute, when contested, shall be held to give them that authority, then they have got market demand in it.

Mr. Cole. Your proposition is, as I understand it, that although a statute with no reference whatever to market demand in it before the court in the future that nevertheless they will read it into the Arkansas law?

Mr. Fouts. And I will tell you why.

Mr. Cole. Your position is that they will show that the act of the legislature specifically eliminating it, meant nothing?

Mr. Fouts. You are making an argument that may not actually reflect it.

Mr. Cole. I have a very definite impression as to the Arkansas law, and I am surprised to hear your statement. I am quite confident that those who have the view which I have taken, would be surprised to hear that. You think that the same thing could be accomplished now without the specific congress.

Mr. Fouts. That is right, and I was going to tell you why.

Mr. Cole. I can see why that is possible.

Mr. Fouts. They have the power to compel the taking ratably of the production from every well and what they can do is to fall back on this method that has come into vogue generally. I think it may be they are in effect embodying in their statute the same effect that was accomplished or sought to be accomplished under the original Common Purchaser Act of Oklahoma which the courts struck down and I think the courts might today sustain a Common Purchaser Act, so that by a simple straight statement an act which provides that every well in the field should be given its prorata or ratable portion of the outlet and might be sustained, in view of this written argument, with which I will proceed. May I start that paragraph over?

Mr. Cole. Yes.

Mr. Fouts. Someone has handed me a note calling attention to the fact that the Arkansas law has a specific provision for authority to prevent the accumulation of storage. I do not think, however, that necessarily adds to or subtracts from it.

Mr. Cole. Who is the gentleman who just gave you that assistance?

Mr. Baker. Hines H. Baker.

Mr. Cole. Where are you from, Mr. Baker?

Mr. Baker. The statute provides that they have the right and authority to prevent the accumulation of oil in storage.

Mr. Cole. I do not want to interrupt Judge Fouts. I just want your name and address.

Mr. Baker. Hines H. Baker, Humble Oil & Refining Co., Houston, Tex.

Mr. Fouts. Of course, coming back to the matter, the sum and substance of my position, and I think the chairman understands it, is that it may be a matter of litigation and it may be held that they do not have that authority. They surely are exercising it today, however, in the belief that they have.

I will begin at the beginning of the paragraph of my written statement, in the midst of which I stopped, in order to preserve continuity.

That thought (balancing supply and demand) grew into and became the basis of the so-called market-demand statutes which now appear in the conservation laws of practically all of the States. The first of these statutes, that of Oklahoma, was sustained by the Champlin case above referred to. These statutes in effect require the regulatory body to hear evidence on the question of total demand for the oil available from each pool within the State and to determine the total demand for oil available from all the fields in the State. Based on such evidence and such findings there was fixed the allowable for the State and for the several fields and for the several wells in each field for some definite period.

This plan likewise went through the crucible of litigation involving all of the engineering and legal complications which may be imagined, and even after it became recognized and established by court decision it seemed plain that another step must be taken to make it function.

There were large quantities of oil in storage above ground and because of their ownership of such above-ground oil many purchasers for many reasons frequently declined to purchase from all of the wells in a given field. They were in a position to draw on their above-ground reserves and avoid the necessity of meeting their requirements from current production and therefore were in a position to take the current production from their own wells and decline to take and purchase the production of others.

In a slow, fumbling way, like a growth of nature, it began to be recognized that if storage of oil above ground was reduced to the minimum amount necessary for working stocks—that is, necessary to fill pipe lines, tank bottoms, boats in transit, and supply a reasonable amount for current refining purposes—then this major essential to conservation, namely, well connections with a ratable outlet for all wells, might be attained. If the above-ground storage was reduced to this minimum requirement the purchaser would find it necessary to take ratably from all wells the amount allotted by the regulatory bodies. There would be no surplus above-ground storage from which to make withdrawals.

It hasn't just happened occasionally but it has actually happened hundreds and hundreds of times than an oversupply above ground has resulted in the wells in large sections of many fields finding their pipe-line connections cut off by purchasers who were able to supply their needs out of storage. Until above-ground stocks were reduced to necessary minimum levels excess storage must of necessity and has been of necessity a substantial factor of dislocation and disruption in any conservation program in the fields where disconnected wells occur. There can be no workable conservation plan to prevent waste either above ground or below ground, in the universally accepted sense, where such conditions exist.

During the past 3 or 4 years there has been a slow but steady decline in above-ground storage. This has been brought about by the united effort of the regulatory bodies of the several States who have come to realize that it was necessary to permit withdrawal of a portion of the above-ground excess, leaving some amount less than the current consumption available for distribution among producing wells.

In searching for evidence that could be reliably followed on the question of current demand, regulatory authorities have tried many sources of information. Originally they relied on nominations or written statement of purchasers of the quantity of oil desired, the quality desired, and the field from which desired, for purchase. Duplication and mistake and fraud combined to make this method of questionable value. Since the formation of the Interstate Oil Compact Commission that body through its request and cooperation has secured the aid of the Bureau of Mines in making monthly forecasts of the market demand which is allotted by the Bureau among the several States according to actual market movements occurring during the preceding period.

This source of information has been mathematically accurate and its forecasts are recognized as reliable evidence. The Bureau aided in the movement toward reduction of above ground stocks by deducting from its estimates of demand the quantity taken from storage during the preceding period, leaving a net balance available to be allocated among the States, and later upon dropping this plan has made its estimate with a sufficient lag in amount to still account for withdrawals from storage.

At this point let me call attention to the fact that if disconnected wells in a given field became the basis of breakdown in conservation that likewise the conservation authorities have been confronted with a Herculean task to make equitable and reasonable allocations among fields themselves. Failing to do this invariably resulted in too large or too small an allocation for given fields. If too large, that is, if in excess of actual demand, the immediate threat of disconnected wells arose. If too small, there was danger of complaint and litigation and consequent disruption from the purchasers and refiners needing more of the particular quality of oil from the restricted field or from producers emphasizing this need.

There has therefore been a constant human trial and error program seeking to do equity on a broad workable scale. During the past 2 or 3 years these efforts have been substantially successful in the majority of the fields. Texas alone by the way has in excess of 500 such fields and in excess of 80,000 wells. All well connections with ratable outlets have been preserved and therefore the conservation program has been made workable. To make this possible substantial equity and a fair place in the market has been provided each of these 500 Texas fields.

No plan of conservation other than one highly localized and quickly responsive to changing conditions could possibly succeed of operation.

The right of suffrage, the influence or personal knowledge, the judgment of a local court obtainable within a few hours, and all of the other myriad influences of local self-government have operated to bring this program to a point of success which previously seemed improbable—thus giving the consumer through the purchasing refiners their full needs, doing equity to each well owner and to each pool and at the same time avoiding waste under the very best engineering practices.

Thus matters of conservation steadily improved. It appeared in the forepart of the year 1939 that during that year above-ground storage would probably be reduced to the minimum required for actual working stocks, at which time it was anticipated that current consumption or demand would be fully met by current production, all of which would then of necessity be taken ratably from all of the wells in each of the fields in each of the several States, such result following as a natural sequence from the fact that failure to do so would leave purchasers with an insufficient amount of oil.

At a time when it was thought by the regulatory bodies generally that this objective had been reached a substantial body of purchasers indicated their disbelief by instituting a series of substantial and disrupting reductions in posted price.

It is necessary at this point to remember the background of the slow growth of the concept of proration and the supporting concept of market demand contained in the statutes of the several States by which the regulatory bodies are enjoined to balance supply with current demand in order to compel ratable taking so as to preserve universal well connections, the essential of any kind of conservation or waste prevention measure.

Confronted with what appeared to be indisputable proof that they had not attained the objective sought, these regulatory bodies were confronted with an emergency that required immediate action if their conservation and waste prevention programs were to be sustained. Large groups of wells were becoming disconnected because purchasers were declining to take oil. There seemed to be a substantial and widespread dislocation. All of the ability to practice true conservation, in the generally accepted term, was again disappearing. If these signs were to be left unheeded the threat of general disruption by loss of well connections was a threat at the conservation program of all of the States.

Texas immediately did what it had been doing many times before. It closed down all of the wells which could be closed without substantial waste or injury. Oklahoma shortly afterward indicated its intention to follow suit. The compacting States met and declined to take any concerted action but by resolution checked the problem and its solution to each State, practically all of whom shortly afterward followed the example of Texas and Oklahoma.

Afterward at a hearing before the Railroad Commission of Texas, the effect of which was Nation-wide in the accumulation of data, it was disclosed that at the time of the shut-down there was approximately 260 million barrels of oil above ground and that at the end of the shutdown there was approximately 230 million barrels of oil above-ground storage. It was also developed that the desirable minimum above ground storage was somewhat between the figure of two hundred and two hundred and fifty million barrels.

The immediate result of the emergency action on the part of the regulatory bodies was an immediate reconnection with all of the disconnected wells, thereby again placing the regulatory bodies in the position where they could carry out in every field the general program of waste prevention both above ground and below ground.

It now appears that the oil States have finally succeeded in bringing about, through the slow American process of growth, a state of affairs wherein the essential of connected wells with a ratable place in the market may be permanently relied upon for successful enforcement of the waste prevention program, unless they be prevented by legislation such as that proposed by the Cole bill. This is a great achievement. It is an achievement a large proportion of the success of which may be attributed to the Interstate Oil Compact Commission, the creation of which was recommended by this committee as the result of its former investigation and report.

I wish to make a statement at this point which may appear to be rather amazing. It is this: This whole movement which I have described as the evolution of the concept of conservation; this proposed Cole bill; and the majority of the proposals designated as proposals for conservation; are not conservation or waste prevention measures primarily but are measures the true import and purpose of which has been to regulate and ameliorate the effects of a rule of property commonly known as the rule of capture. Many of us resisted much of what I have depicted above believing that the proper approach to the rule of capture problem should have been made under a better plan. That fight appears to be ended. We have now proceeded some 15 or 18 years down the road of regulation. We have drilled 100,000 wells under this plan. By court decision, actual trial and error, and by the slow process of experimentation this plan has come to the point of success and it should not be disturbed. It works for the successful use of sound engineering principles. It does accomplish the highest attainable form of waste prevention in the production of oil and gas.

But if this committee and if those who propose such legislation as the Cole bill wish to extend the consumptive life of our reserves, which are now estimated to be good for 15 or 20 years, they cannot do it by this type of legislation. They may do so effectively by regulation directed at the improvident and wasteful utilization of petroleum products. Nobody really believes this drastic restriction necessary. It would face the same constitutional difficulties which confront the Cole bill.

It seems so remarkable that having evolved a successful pattern of regulation we should consider changes, the effect of which might be to destroy our form of Government in order to add what at the most is claimed to be but a trifling percent of our reserves and thereby add only a trifling percent to the consumptive life of these reserves, when if the true purpose were the latter, a thousandfold greater gain could be had by the method suggested above.

Not unlike Congressman Wolverton, I have looked with misgivings at the exercise by the regulatory bodies of the power conferred upon them by the market demand statutes. I opposed them. If what I have set forth in this paper is true, and I cannot escape the belief that it is true, then perhaps the uneasiness which some of us have felt may not have been wholly justified.

I realize the power to balance supply and demand where you are dealing with true supply and true demand, is universally recognized as the power to affect price. Here, however, is it not true that that power is not being extended to true supply which now is represented by developed reserves of an estimated quantity approximating some 17 to 20 years' supply? Is it not true that the effect of limiting the quantity currently produced to current consumption is only another way of effectively saying that oil is not to be stored above ground in excess of amounts required for working stocks?

It seems clear to me that the primary factors affecting price of oil for some time may have been the status of the facts as to location and quantity and price and cost of reserves which have come into existence.

May it not be possible that the facts as I have tried to set them forth mark a remarkable innovation in the nationwide economy of a great industry? Is it not probable that the regulatory bodies can never by their action successfully affect the price of oil? Is it true that the reserves and their status as to availability, quantity, and cost have become the basis for price change? These reserves are very essential for any plan of conservation as complicated and intricate as that which I have set forth briefly above. Incidentally, these reserves developed under State regulation stand as a challenge to the hue and cry of national defense. Fortunately the experience of the past 10 or 15 years appears to deny the fear that market demand statutes under existing facts affect price. Actually the quality of refined products has advanced tremendously and is infinitely better than 10 years ago while the price has consistently grown cheaper and is today probably less than one-half the former price, all factors being taken into account.

Under the system prevailing 10 or 15 years ago there was little or no restriction on the production of oil. Flush production by its decrease or increase exercised the primary and most forceful influence on the price structure of oil. In the very nature of things flush production by its wide fluctuation brought about wide and destructive fluctuation in price. This fluctuation was more destructive of the little operator than of the large operator. Anyone who has observed the actual experience of that time knows that it was then axiomatic that it seldom happened that an independent operator was able to survive the discovery of an oil field. He usually lost in the process of price fluctuation.

I have personally observed, working in the field, the discovery of a new oil field by a wildcat promoter and have watched him lose everything he had by the process of price fluctuation. Such fluctuation made for greater average cost and that cost was paid by the consumer.

Fluctuation in price based on change of fluctuation in developed reserves is unpredictable at this time, I admit, because we are just entering upon that experience. It would seem reasonable, however, to anticipate that such fluctuation will be much smaller and much slower in its effect of adjustment, and therefore much more satisfactory from the standpoint of the consumer and from the viewpoint of those interested in preserving the individual or independent operator.

There are still many unanswered questions in the industry, but having come so far, having attained so great a degree of success, and having paid such a great price, I cannot understand why any thinking man who was willing to embark on this journey when it was so dark would now be willing to abandon or hamper it when the path ahead seems so bright.

In the great body of this 17 to 22 billion barrels of reserves is commingled the stripper well production. If the capacity to discover, and the inventive ingenuity to find, new ways of adding to our supply finally make available a national reserve so great and inexpensive that stripper well production is lost, this will come about to the gain of the consuming public and only as the result of declining price. Otherwise that great body of production fits in and enjoys its place in this program.

Personally I have long been convinced that before our reserves are exhausted to the point where price is likely to be substantially increased there will be in existence, either by way of discovery of a substitute or by way of discovery of inexpensive methods of extraction of oil from coals and shales, a competitor with whom oil will have difficulty in keeping pace.

While I have indicated that the force which has driven this movement has been more of a desire to adjust and regulate by legal and equitable means the rule of capture, it may be that we have accidentally stumbled on an invaluable addition to our economic and governmental life.

If we can avoid the effect of price fixing and at the same time eliminate the destructive and sickening effect of wide price fluctuation in oil while we are keeping alive the incentive to greater discovery and cheaper production under a plan that promises reward to the most competent and the most diligent, if we can as we are now doing practice all of the known and tried engineering principles of conservation, if we can provide connections for every well and an equitable outlet for all of the pools in the producing States, surely that is worth preserving.

If through the interstate oil compact we have enlarged and can carry into successful use the constitutional power that permits States to come together in the perplexities of a common problem and work for its solution, surely it is worth preserving.

It would seem a tragedy at a time when we are struggling so desperately to preserve the healthful functioning of democracy that there should be struck down what may be a remarkable and successful innovation in the economy of a great industry, as well as the successful utilization of a little-tried constitutional method of finding how to accomplish a concert of action under our dual form of government with full preservation of all of the priceless virtues of liberty. The American plan of proration or conservation of oil by the States and their local authorities and the interstate oil compact commission may be such vehicles and if they can attain these objectives no greater contribution can be made to the happiness and welfare of this Nation. Every oil-producing State will eventually fall into these plans. It takes time to learn these lessons.

Surely no emergency exists demanding the wholesale destruction of Americanism which can easily follow from the adoption of the spirit and principles inherent in the Cole bill.

Mr. KELLY. Judge Fouts, I have a statement here which reads:

> Waste of natural gas: The monthly summary of natural gas production and disposition, compiled at the direction of the Railroad Commission of Texas, shows

for November 1939, that 451,814,000 cubic feet of natural gas was vented to the air daily in Texas and this represents 11.36 percent of the dry natural gas and the casinghead gas production and disposition reported to the commission. Of the 89,174 producing oil wells reported in Texas for November 1939, 45,751 wells or 51.3 percent were reported as being connected to gasoline plants or pipe lines.

Evidently this might be taking in the reports on gas there around in the Panhandle.

Mr. FOUTS. I imagine it is the sum total of all gas that is produced and not utilized in the production of oil.

Mr. KELLY. Evidently it is the sum total.

Mr. FOUTS. Our statutes require the utilization for certain limited purposes of gas from gas wells and forbids their being produced unless the gas is being utilized.

Now, I do not know whether you gentlemen are aware of the fact or not, but we are probably on the verge of another very large addition to our reserves, and that addition is coming from production at great depth, where tremendous quantities of gas are being encountered, and I suspect that some of this total which you read embraces wells from fields of that kind which are just being brought into production.

Now, it so happens that I am somewhat personally familiar with that problem. The Railroad Commission of Texas has issued a great many orders in recent months dealing with wells and fields of that type, seeking to effectually bring about a program under which all of that gas, where it is in substantial quantities, will be returned to the formation and in one field—I happen to represent substantial owners of production who are spending in excess of $1,000,000 to return gas back to formation under pressure so great that it required the construction of machinery and equipment never before made, all of which had to be custom built.

Considerable difficulty naturally is going to be encountered in connection with so venturesome and so great an enterprise.

I think before this committee finally makes its report on this bill that that field alone will be free from a single foot of gas wastage.

Those fields are unlike the shallower oil fields where in dealing with the problem of utilizing the small amount of gas that comes to the surface from each individual well, the operator is confronted with the cost factor that makes the expense of saving the gas greater than the recovery from sale; but in these big new reserves conditions are different.

Mr. COLE. What depth do you have in mind when you are speaking of that.

Mr. FOUTS. Ten thousand feet and in excess of 10,000 feet.

Mr. COLE. What is the difficulty in some of the other fields where 12,000 or 13,000-foot wells are drilled, as to the costs being justified by the recovery.

Mr. FOUTS. Well, if I may be permitted to say so, Mr. Chairman, I have a suspicion that the production that is going to come from those fields will be the cheapest that has ever been sold to the public, because we have made some tremendous strides and if the programs that have been initiated by the Railroad Commission of Texas prove successful, you will have probably the first instance of an oil field operated without waste, and I mean waste of any kind, or practically none, something that nobody has conceived of, where the cost of lifting is only the added cost of restoring those great quantities of gas to the reservoir and maintaining the reservoir pressure, which I think will be perfected with the same kind of growth that I pointed out here as the growth by which we have evolved the present workable plan of conservation—growth from actual experience.

I hope my prophesy proves to be true.

Mr. COLE. I do also.

Mr. FOUTS. Congressman Kelly, of Illinois, asked me a question that makes me think of his State, and I want to say——

Mr. KELLY. May I interpose there?

Mr. FOUTS. Yes.

Mr. KELLY. We have observed in the Louden field at Mattoon, Ill., one of these repressuring plants in operation. They have gone into it voluntarily themselves to conserve the natural gas, placing it back in the sands of the earth. There is only a very little wastage of gas which naturally would accumulate under any condition.

Mr. COLE. That was the Carter oil field, I think, Mr. Kelly refers to.

Mr. KELLY. Yes.

Mr. COLE. It is a very efficiently operated field.

Mr. KELLY. I presume that those plants are being installed in Texas.

Mr. COLE. I think they call it the Sunflower development.

Mr. KELLY. Circular with the repressuring well in the center of the field.

Mr. FOUTS. It might be interesting to this committee to know that, in the process of this particular development I speak of, in seeking to restore this gas to the reservoir, in the first experiment in restoring this gas to the reservoir, the pressure blew the well up. Fortunately there was no loss of life, but there was destruction of material that is almost inconceivable that occurred in connection with it, the pressure was so great.

I want to make this statement, too, with respect to the State of Illinois, which has been frequently mentioned in these hearings: Illinois is not guilty of nearly as great a crime as is being charged. They may be making a very serious financial mistake. They may be spending their capital. They may be getting quick money by selling their oil for less than it is worth and it may be that there will be a great deal of that oil left in the ground, and, therefore, it could be said that there has been a great deal of waste; but remember that we, all over this country today, are going back and reworking fields that were originally produced in that manner by water flooding, or repressuring, or other processes, getting the oil out in many instances cheaper than they did originally. So, that oil is not lost and there has not been any waste in the sense that that oil is not recovered.

Illinois may get less money out of what they are doing.

I wanted to say that, because I feel that this State is entitled to learn its lesson the best way it can, and I am in favor too of their having proper conservation statutes.

Mr. KELLY. Illinois, I think until 1902, was the leading oil-producing State of the Nation, up to about that period of time.

Mr. FOUTS. Now, I have put forward what I have said here without sponsoring it in the sense of advocating that these things are true. I want this committee, which originated the concept of the Interstate Oil Compact Commission, to see an over-all picture free of the details of the multitude of things you are constantly hearing, and to see how you may have set in motion something that may exceed your fondest hopes.

Mr. Cole. Thank you, Judge.

Mr. Fouts. Thank you.

Mr. Cole. Judge Fouts, during our previous hearings we had a discussion in which I participated at some length, about the effect of the excessive cost in some instances, of producing oil from deep wells such as you referred to. I do not have time to go into it this afternoon, but I think you will find upon the printing of the hearings that testimony quite interesting.

Mr. Fouts. I hope that my conclusions are correct, because it will certainly be a great thing if this industry can continue to give the people a better product for less money, and that is what it has been doing.

Mr. Cole. I have quite a number of telegrams and resolutions pertaining to this bill, for and against it.

Unless there are some others in the room who want to be heard, the committee will recess, or adjourn, until Monday, February 19, 1940, at which time we will hear the State compact group, and on the 20th, the industry. If anyone is interested in the witnesses who are to appear on behalf of the industry, I have just received the list. It is quite a capable group. I do not know whether the press got it or not. It is in my office if you care to see it.

We thank you gentlemen very much for your contribution to the hearings.

(Thereupon, at 3:25 p. m., the committee adjourned to meet on Monday, February 19, 1940, at 10 a. m.)

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